Chapter 3 Affected Environment, Environmental Consequences, and Mitigation

3.1 Regional Setting

The proposed project site is located in Gilliam County, in the north-central portion of Oregon, within the Deschutes-Columbia Plateau. It is approximately 40 miles south of the Columbia River and 5 miles northwest of Condon and Highway 19 (ORE19) and adjacent to Highway 206 (ORE206). Specifically, the project site is located along ORE206 between mileposts (MP) 31 and 39 (Figure 2.1-1). The project would occupy a permanent footprint of approximately 38 acres.

The 38-acre project site is located within a 4,200-acre study area along topographic ridges and uplands between approximately 2,400 and 3,300 feet above mean sea level (Figure 2.1-1). The study area includes portions of Sections 32 and 33, Township 2 South, Range 20 East; Sections 3, 4, 5, 9, 10, 13, 15, 22, 23, 24, 25, 26, and 35, Township 3 South, Range 20 East; Sections 1 and 2, Township 4 South, Range 20 East; and Sections 7 and 18, Township 4 South, Range 21 East. The study area is located on U.S. Geological Survey 7.5-minute quads Igo Butte, Gwendolyn, Schott Canyon, and Condon (from north to south).

Tenmile Canyon and Ferry Canyon are adjacent to the northern part of the study area to the east and west, respectively. A Pacific Gas Transmission-Pacific Gas & Electric (PGT-PG&E) natural gas pipeline traverses northeast to southwest across the southern part of the study area, and a 69-kV BPA transmission line runs generally parallel to and west of ORE206.

The project site and study area lands are privately owned and have been used primarily for growing crops for approximately 100 years. The broad plateaus that make up the project site and study area are used for dryland farming and generally produce wheat and spring barley. Steep slopes adjacent to the study area are generally not farmed, and adjacent drainages support native and semi-native shrub-steppe habitats. No trees are located on the project site, and trees that are present in the study area are near residences and adjacent to scattered abandoned homesteads.

The *study area* discussed in the resource sections that follow is the 4,200-acre study area shown in Figure 2.1-1, unless otherwise identified for a specific resource. The *project site* discussed in the following resource sections is the location, within the broader study area, of the proposed 38-acre phase 1 and phase 2 wind turbine strings, project access roads, O&M building, electrical substation, and electrical transmission line connecting to BPA's Condon-DeMoss line. The project site would have a permanent footprint of approximately 21 acres from the first phase, and an additional approximately 17 acres from the second phase (38 acres total). This EIS covers the entire study area and could therefore be used for decisionmaking on future wind projects located within the study area.

3.2 Land Use and Recreation

The land use and recreation study area extends from MP 27 to MP 39, along Highway 206 (ORE206) (Figure 2.1-1). Reference is also made to certain recreation sites in Condon.

3.2.1 Regulatory Framework

The regulatory framework for this analysis includes the Gilliam County Comprehensive Land Use Plan and Zoning Ordinances, adopted in November 2000; Gilliam County Zoning Map; Oregon Statewide Planning Goals 3 (Agricultural Lands) and 11 (Public Facilities); and Oregon Administrative Rules.

The majority of Gilliam County is zoned Exclusive Farm Use (EFU), including the study area and adjacent lands. There are no regional or special district plans that govern the study area. Uses that are permitted outright in EFU zones generally include farms, single-family dwellings, harvesting, utility facility service lines, operation and maintenance of transportation facilities, fire service facilities, irrigation canals, and sites for takeoff and landing of model aircraft. Additional uses, such as the proposed wind power project, are permitted with a Conditional Use Permit.

The proposed project would necessitate a Goal Exception to Oregon Statewide Planning Goal 3, which states that agricultural lands shall be preserved and maintained for farm use (OAR 660-015-0000[3]).

The Conservation Reserve Program (CRP) is a federal program administered by the Natural Resources Conservation Service (NRCS) under the authority of the Farm Bill. The CRP encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filter strips, or riparian buffers. Farmers receive an annual rental payment for the term of the multiyear contract (typically 10 years).

3.2.2 Study Methodology

To conduct the land use analysis for the proposed action, the Gilliam County Comprehensive Land Use Plan and Zoning Ordinances, the Zoning Map, the Oregon Administrative Rule 660.033.0130, and the Oregon Statewide Planning Goal 11 (Public Facilities) were reviewed for applicable policies and existing land use designations. A site visit was conducted in October 2000 to further document current land uses. Interviews with the Gilliam County Planning Director provided information regarding plans, policies, procedures, and ordinances relevant to the proposed project.

To conduct the recreational analysis, the Oregon Parks and Recreation Department; Bureau of Land Management (BLM), Prineville District Office; Gilliam County Planning Department; and Deschutes State Park were contacted.

3.2.3 Affected Environment

3.2.3.1 Land Use

The project site and study area are composed of privately owned land used primarily for non-irrigated agriculture (primarily crops, including barley and wheat). A small portion of the project site and study area (13 percent and 8 percent, respectively) are currently held as CRP land.

Additional land uses are varied throughout the study area. An active gravel quarry is located within the study area. A grange hall, an occupied house, and a meteorological station are located in the study area, and abandoned farming/ranching equipment and implements are scattered throughout the study area.

Residential land use within and adjacent to the study area is of low density and consists of houses with barns and accompanying outbuildings. A PGT-PG&E natural gas pipeline traverses northeast to

southwest across the southern part of the study area, and the 69-kV BPA Condon-DeMoss transmission line runs generally parallel to ORE206 (Figure 2.1-1).

3.2.3.2 Recreation

There are no formal recreational amenities in the study area. The nearest recreational facilities are the City of Condon Park, the Condon Golf Course, and the Gilliam County Fairgrounds, located in Condon approximately 5 miles from the project site. The only identified recreational activity is hunting, which may be allowed by landowner permission in some portions of the study area.

3.2.4 Environmental Consequences—Proposed Action

3.2.4.1 Definition of Impact Levels

- Land use and recreation impacts would be considered **high** if the proposed project would substantially preclude the primary existing or planned use of the land, result in a major change in overall land use patterns, create considerable conflict with permitted land uses, substantially alter existing recreational activities, or create extensive new recreational opportunities in the area.
- Land use and recreation impacts would be considered **moderate** if the proposed project would create a modest change in the primary existing or planned use of the land, overall land use patterns, recreational opportunities, or slightly conflict with permitted land uses.
- Land use and recreation impacts would be considered **low** if the proposed project would not noticeably change the primary existing or planned use of the land, would cause only, at most, a minor change in overall land use patterns or recreational opportunities, and would not conflict with permitted land uses.

3.2.4.2 Impacts during Construction

Land Use

Land use impacts during construction of phases 1 and 2 of the proposed project would be low. Overall, the project would be consistent with the purpose and intent of the Gilliam County EFU zone, and in Gilliam County, public service facilities are allowed as a conditional use. Development of the proposed project would add a system of wind turbines and associated facilities to the existing land uses, which include crop growing, cattle grazing, and CRP land.

During construction of phases 1 and 2, approximately 58 acres and 46 acres, respectively would be temporarily disturbed. For phase 1, this area of temporary disturbance includes approximately 30 acres of cultivated cropland and 4 acres of CRP land. For phase 2, the area of temporary disturbance includes approximately 35 acres of cropland and 10 acres of CRP land. During construction, livestock grazing in additional areas may have to be temporarily restricted to avoid conflicts between livestock and construction equipment. The turbines would be spaced to allow for farming and crop dusting.

SeaWest would have to convert the lease of these parcels and withdraw some or all of the parcels from the CRP, through contract revisions with the NRCS and the landowners.

Construction would take 4 to 5 months per phase. Phase 1 is proposed to begin in late 2001; the second phase could be constructed during spring/summer of 2002 or later. Construction activities would be coordinated with landowners to minimize disturbance of farm operations. All areas

temporarily disturbed would be regraded and seeded as necessary to restore them to their original condition.

Recreation

Impacts on existing recreational facilities during construction of phases 1 and 2 of the proposed project would be low to non-existent. There are no formal recreational facilities in the vicinity of the project site. However, upland bird hunting could be interrupted temporarily in the vicinity of the project site during construction. Construction of the project could encourage sightseeing by travelers on ORE206.

3.2.4.3 Impacts during Operation and Maintenance

Land Use

Operation and maintenance impacts on land use would be low. The permanent project facilities would occupy approximately 38 acres total (21 acres and 17 acres for phases 1 and 2, respectively). Phase 1 would impact approximately 12 acres of cropland and 2 acres of CRP land, while phase 2 would impact an additional 13 acres of cropland and 3 acres of CRP lands.

Although the cropland (and CRP land) converted to use for the project would no longer be available for farm use, it represents a very small portion of the agricultural acreage in the study area and a negligible portion of the agricultural land in Gilliam County (more than 696,000 acres). Landowners would receive compensation for the project use of their property through a lease agreement with the proponent.

The proposed project would not appreciably disrupt the current and planned agricultural uses of the land. Given the turbine spacing, the operation of agricultural equipment would not be impaired, but some plowing patterns may have to be adjusted. The turbine spacing and orientation along a north-south axis would allow crop dusting. The project would not alter existing fencing around the project site except to add gates, which would be kept locked, to certain access roads. The landowner would have keys to the gates.

Recreation

No operation and maintenance impacts on existing recreational activities are anticipated. The project may cause a minor increase in the number of sightseers on ORE206, but this impact would be low.

3.2.4.4 Impacts during Decommissioning

Low impacts to land use would be anticipated during decommissioning. During dismantling of project facilities, temporary land disturbance of the type and magnitude described earlier for project construction would be anticipated. Temporarily disturbed lands would be restored to their original condition through grading and planting. Foundations would be removed to a depth of 2 feet, or until bedrock was hit.

Once project facilities had been removed, cropland and CRP land taken out of agricultural use could be returned to agricultural use. An exception might be some of the access roads constructed for the project, which could be considered desirable by the local landowners.

Potential recreational impacts from decommissioning would be minor, including possible minor and temporary interruption of game bird hunting, and a minor increase in roadside sightseeing.

3.2.4.5 Mitigation

No mitigation measures are warranted for the low potential impacts to land use or recreation from the proposed project.

3.2.4.6 Unavoidable Impacts Remaining after Mitigation

Following construction, approximately 38 acres would be converted to wind project facilities during the life of the project. This includes a very small portion of the available agricultural land in the study area, and a negligible portion of the available agricultural land in Gilliam County. After decommissioning, the project site would look as it did prior to construction, except for some access roads that may remain at the landowners' discretion.

3.2.5 Environmental Consequences—No Action Alternative

If the No Action Alternative was implemented, existing recreation and agricultural land uses at the project site would continue without influence of the proposed project. However, this does not preclude other development within permitted uses in the study area. Other energy resources would be developed in the region to meet the need for power. As the Resource Programs EIS (RP EIS) showed, these resources would have the same or greater impact to land use and recreation than this project.

3.3 Geology, Soils, and Seismicity

3.3.1 Regulatory Framework

Based on communications with a representative of Gilliam County, the county does not have a critical areas ordinance that would address potential geologic hazards in the project site and study area. There are no specific requirements or guidelines issued by the county with respect to geologic conditions. Current Oregon building codes are specified in Oregon Regulatory Statute (ORS) 455.010 through 455.895. Geologic hazard regulations are overseen by the Oregon Department of Land Conservation and Development, as defined in ORS 660.015. The project site and study area fall within Seismic Zone 2B of the 1997 Uniform Building Code.

The Farmland Protection Policy Act (7 U.S.C. 4201 et seq.) directs federal agencies to identify and quantify adverse impacts of their actions on farmland. The Act's purpose is to minimize conversion of agricultural land to non-agricultural uses.

3.3.2 Study Methodology

The characterization of geologic and soil conditions in the project site and study area is based on existing published information, including topographic maps (U.S. Geological Survey 1970a, 1970b, 1970c, 1987), aerial photographs (URS 2000), geologic maps and documents (Swanson et al. 1981, Walker and MacLeod 1991, Orr et al. 1992, Goter 1994, Madin and Mabey 1996, ODLCD 2000), and the county soil survey (SCS 1984). Federal, state, and local regulations were researched to define the regulatory framework with respect to geology, soils, and seismicity.

3.3.3 Affected Environment

3.3.3.1 Geology

The project site and study area are located in the north-central portion of Oregon within the Deschutes-Columbia Plateau (Figure 2.1-1). The Deschutes-Columbia Plateau covers approximately 63,000 square miles within Oregon, Idaho, and Washington. The geology of the plateau is dominated by the Columbia River Basalt Group, a series of flood basalt flows that were deposited during the Miocene (6 to 17.5 million years ago). The Columbia River Basalt Group consists of four basalt formations: the Imnaha, Grande Ronde, Wanapum, and Saddle Mountains, from oldest to youngest. (Orr et al. 1992.) Two of these four basalt formations (Grande Ronde and Wanapum) underlie the study area.

Wanapum Basalt underlies most of the study area between MP 28 and MP 34, and Grande Ronde Basalt underlies most of the study area between MP 34 and MP 38 (Swanson et al. 1981). The Wanapum Basalt (middle Miocene, 15 million years old) generally consists of gray to dark-gray, medium-grained basalt flows that exhibit blocky to platy jointing (Walker and MacLeod 1991). The Grande Ronde Basalt (middle and lower Miocene, 15 to 17 million years old), underlying the remainder of the study area, generally consists of dark-gray to black aphyric basalt flows (Walker and MacLeod 1991). These basalt bedrock layers are expected to provide an adequate foundation for the proposed wind turbines.

The project site and study area are located along ridges and uplands that are dissected by a network of streams. The project site ground surface ranges between approximately 2,400 feet and 3,300 feet above mean sea level. The ridges are blanketed by a relatively thin layer of soil (1 to 3 feet deep) over basalt. Based on field observations, basalt is commonly exposed within the streambeds adjacent to the study area. Rills and gullies extend upslope from the mainstems of the streams, sometimes to the margins or interiors of the study area.

3.3.3.2 Soils

Based on the soil survey of Gilliam County (SCS 1984), soils in the project site and study area generally have the following qualities:

- Soils are typical of ridgetops and upland areas in the region and developed from a mixture of loess (windblown silt) with small amounts of volcanic ash.
- Soil profiles are approximately 1 to 3 feet thick and underlain by basalt.
- Primary soil series include the Bakeoven-Condon complex; Condon, Mikkalo, Rhea and Valby silt loams; Lickskillet very stony loam; and Wrentham-Rock outcrop complex.
- The erosion potential of these soil series is generally slight to moderate, except on steep slopes.

Based on a review of aerial photographs (URS 2000), no substantial areas of active erosion were identified at the project site. The erosion potential of the project site and vicinity is depicted in Figure 3.3-1.

The Condon and Valby silt loams would qualify as prime farmland if those areas were irrigated. However, none of the study area is irrigated farmland, so it does not qualify and has not been designated as prime, unique, or of statewide importance under the Farmland Protection Policy Act (Maley, Jordan, Dryland Systems Cropping Agent, Gilliam County Extension Service, Condon, Oregon, April 27, 2001–Telephone conversation).

3.3.3.3 Seismicity

Based on an earthquake hazard map for Oregon, the type of earthquake events likely to occur in the project site and study area can be expected to cause slight damage to property and structures (Madin and Mabey 1996).

Seismic hazards in the general project vicinity result from three types of earthquakes: subduction zone, intraplate, and crustal. Subduction zone and intraplate earthquakes are caused by the subduction of the Juan de Fuca plate beneath the North American plate. Subduction zone earthquakes occur at shallow depths beneath the ocean floor, at the boundary between the Juan de Fuca and North American plates. These subduction zone earthquakes, generated off the coast of Oregon, can have magnitudes of 8.0 to 9.0 or greater. Intraplate earthquakes can have magnitudes up to about 7.5 and occur within the Juan de Fuca plate at depths of approximately 20 to 60 miles beneath the earth's surface. Crustal earthquakes are caused by the movement of relatively shallow faults within the North American plate. Most crustal fault earthquakes have a magnitude of less than 4.0 and generally cause little or no damage (ODLCD 2000).

Seismic hazards associated with crustal, subduction zone, and intraplate earthquakes are caused by ground shaking, which can result in surface faulting (ground displacement), landslides, and liquefaction.

Published geologic maps of the study area and vicinity identify a west-northwest trending oblique slip fault that intersects the southern portion of the study area between MP 35 and MP 38 (Swanson et al. 1981, Walker and MacLeod 1991). These geologic maps also identify a syncline (down-warped fold) and two anticlines (up-warped folds) trending west-southwest that intersect the southern portion of the study area between MP 36 and MP 38. These folds are interpreted to be associated with the south-southwest trending Blue Mountains anticline identified by Orr et al. (1992). A review of recent aerial photographs (URS 2000) between MP 34 and MP 39 did not identify any surface evidence of the fault or folds.

A published map of historic earthquakes in the general project area (Goter 1994) identifies the epicenter of a 3.4 to 5.4 magnitude crustal earthquake approximately 10 miles west of the project site. Approximately 25 smaller crustal earthquakes (magnitude 1.5 to 3.4) are identified between 5 and 15 miles to the east and southeast of the project site, just east and southeast of Condon, Oregon. The epicenters of historic intraplate earthquakes are located more than 100 miles west of the project site (Goter 1994).

3.3.4 Environmental Consequences – Proposed Action

3.3.4.1 Definition of Impact Levels

- Impacts related to geology, soils, and seismicity would be considered **high** if the proposed project resulted in increased mass wasting or permanent changes in the natural drainage pattern, if considerable erosion was induced, or if substantial damage occurred to the project facilities because of seismic events (e.g., ground motion, surface faulting).
- Impacts related to geology, soils, and seismicity would be considered **moderate** if the proposed project did not induce mass wasting, if standard soils management techniques would be effective in controlling erosion to within acceptable levels, or if moderate damage occurred to the project facilities because of seismic events.
- Impacts related to geology, soils, and seismicity would be considered **low** if the proposed project did not induce mass wasting, if standard soils management techniques would hold erosion levels

to near existing levels, or if slight damage occurred to the project facilities because of seismic events.

3.3.4.2 Impacts During Construction

Construction-related impacts regarding geology, soils, and seismicity would be low. Construction activities that could induce erosion or unstable slopes include road improvements, road construction, work/storage area clearing, and underground utility cable trenching. Removal of vegetation, modification of topography, and unmanaged stormwater runoff would contribute to potential impacts. Project construction would temporarily disturb approximately 58 acres of land during the first phase, and an additional 46 acres during the second phase (104 acres total). This temporary disturbance is expected to last about 4 to 5 months for each phase of the project.

Standard approved construction practices and erosion management techniques would be employed to prevent mass wasting and control potential erosion to near existing levels. These practices and management techniques include:

- minimizing vegetation removal;
- avoiding construction on steep slopes or areas designated as having a high susceptibility to erosion (Figure 3.3-1);
- properly designing cut-and-fill slopes (if any are required);
- installing roadway drainage (if needed) to control and disperse runoff;
- ensuring that access roads contain pervious, gravel surfaces;
- judiciously applying erosion control measures such as silt fencing, straw mulch, straw bale check dams, and soil stabilizers, as well as reseeding disturbed areas as required; and
- minimizing construction and increasing gravel cover on roads during wet weather to reduce potential rutting and soil loss.

Earthquake-induced landslide areas are not apparent at the study area or vicinity, and the potential for fault movement along crustal faults in the project vicinity is considered low. The type of earthquakes likely to occur in the project site and vicinity would be expected to cause only slight damage to project facilities. The project would be constructed in accordance with applicable seismic design codes, including foundations for the wind turbines placed directly on competent bedrock.

3.3.4.3 Impacts During Operation and Maintenance

Operation and maintenance-related impacts regarding geology, soils, and seismicity would be negligible. Project facilities would have a permanent footprint of 21 acres from the first phase, and an additional 17 acres from the second phase (38 acres total). This post-construction footprint is substantially less than the area that would be temporarily disturbed during construction (104 acres).

The soil management practices that would be used to minimize potential impacts from construction activities would also be applied to operation and maintenance activities, as necessary. All roads, wind turbine pads, and trenched areas would be regularly inspected and maintained to ensure erosion levels are the same or less than present conditions.

3.3.4.4 Impacts During Decommissioning

Potential impacts regarding geology, soils, and seismicity during decommissioning (dismantling) of the facilities would be similar to those during construction and would be low. Site reclamation would be based on site-specific requirements and techniques commonly employed at the time the area is reclaimed. As necessary, this could include regrading, spot replacement of topsoil, and revegetation of all project-disturbed areas that would not be used immediately for plow-based agriculture. Project access roads would be reclaimed or left in place based on landowner preference. Foundations would be removed to a depth of 2 feet, or less if bedrock is encountered. The land would then revert exclusively to landowner control.

3.3.4.5 Mitigation

No mitigation measures are required, if the practices and management methods listed in Section 3.3.4.2 are used.

3.3.4.6 Unavoidable Impacts Remaining after Mitigation

No adverse impacts are anticipated to remain after mitigation measures are implemented.

3.3.5 Environmental Consequences—No Action Alternative

Under the No Action Alternative, the potential impacts to geology, soils, or from seismic activity at the project site would remain the same as under present conditions, without the influence of the proposed project.

3.4 Fish

3.4.1 Regulatory Framework

3.4.1.1 Federal Endangered Species Act (16 U.S.C. §§ 1531-1544, December 28, 1973, as amended 1976-1982, 1984 and 1988)

The Endangered Species Act (ESA) provides broad protection for species of fish, wildlife, and plants listed as threatened or endangered in the United States or elsewhere. The ESA is administered by the U.S. Fish and Wildlife Service (USFWS) and, for salmon and other marine species, by the National Marine Fisheries Service (NMFS). The ESA defines procedures for listing species, designating critical habitat for listed species, and preparing recovery plans. The ESA also specifies prohibited actions and exceptions.

Prohibited actions defined in Section 9 of ESA include “take” of a listed species. Take is defined as any action that would harass, harm, wound, or kill a listed species. Section 7 of the ESA enables the USFWS or NMFS to issue a permit to a federal agency for incidental take (that is, unintentional take of a listed species resulting from otherwise legal activities).

3.4.1.2 Oregon Endangered Species Act

The Oregon Endangered Species Act requires the Oregon Department of Fish and Wildlife (ODFW) to develop programs for the management and protection of state-listed species. However, the Act does not prohibit the take of state-listed species.

3.4.1.3 Gilliam County Code (Section 4.090. SR. Significant Resource Combining Zone)

Gilliam County designates Significant Resource (SR) Zones to protect significant mineral resources, scenic areas, natural areas, and fish and wildlife habitat in the county.

3.4.2 Study Methodology

Fish studies were conducted by Jones & Stokes fisheries biologists. The study area for fish includes surface waters located within the same watershed as the project site. Fish presence and streams in the project vicinity were evaluated based on ODFW, StreamNet, NMFS, USFWS, and Bureau of Land Management internet resources, U.S. Geological Survey maps, the John Day River Management Plan and EIS (BLM 1999), and personal communications with ODFW (Unterwegner, Bailey pers. comms.) and BLM (Ralston pers. comm.). Stream conditions and drainages within the project site were then field checked by Jones & Stokes biologists on October 16, 17, and 18, 2000.

3.4.3 Affected Environment

3.4.3.1 Setting

Cropland dominates the project site and study area. Crops grow on broad hilltops (referred to as "table-tops" by local residents) following a north-to-south trending ridgeline. This ridgeline is bordered by an irregular pattern of slopes and drainages leading to deeply incised drainages and streams (Figure 3.3-1).

These broad hilltops encompass about 60 percent of the landscape in the project vicinity. Such areas are utilized for dryland farming and generally produce wheat. Steep slopes are generally not farmed and support Conservation Reserve Program lands (planted in perennial grasses) as well as some semi-native shrub-steppe habitats. Drainages support native and semi-native shrub and grasslands. Hay Creek, Tenmile Canyon, Ferry Canyon, and Sniption Canyon are the four major drainages in the project vicinity (Figure 2.1-1). One wetland exists within the study area and three wetlands lie adjacent to but outside the study area. Trees are rare in the vicinity but present near residences and adjacent to scattered abandoned homesteads in the general project vicinity.

No fish-bearing streams are located in the study area. The following fish-bearing streams occur in the areas surrounding the project site, in the general vicinity (Figure 2.1-1):

- Hay Creek and Dry Fork Hay Creek to the east,
- Tenmile Canyon and Sixmile Canyon toward the north,
- Ferry Canyon to the west, and
- Sniption Canyon to the south.

These streams eventually drain to the John Day River, 10 miles west of the project site, which in turn drains to the Columbia River. Hay Creek, Dry Fork Hay Creek, and Sixmile Canyon are perennial streams, while Tenmile Canyon, Ferry Canyon, and Sniption Canyon are seasonal.

3.4.3.2 Federally-Listed Species

Summer Steelhead

Summer steelhead (Middle Columbia River Evolutionarily Significant Unit) are federally listed as a threatened species under the ESA. They have been reported in the following streams, which drain the project vicinity:

- Hay Creek, from the mouth to river mile (RM) 17.0 (approximately 2 miles downstream from the project site);
- Ferry Canyon, from the mouth to RM 9.0, the confluence with Lamberson Canyon (approximately 5 miles downstream from the project site);
- Dry Fork Hay Creek, from the confluence with Hay Creek to RM 7.0 (approximately 3 miles downstream from the project site); and
- Sixmile Canyon, approximately 9.5 miles downstream of the project site.

Although habitat maps for the project vicinity do not indicate the presence of summer steelhead in Tenmile and Sniption Canyons, these streams could support summer steelhead (Unterwegner pers. comm.).

Bull Trout

Bull trout are listed as a threatened species. Bull trout have not been recorded in the project vicinity (Unterwegner pers. comm.) and are believed absent.

3.4.3.3 State-Listed Species

Pacific Lamprey

The Pacific lamprey is a sensitive species classified by the state as vulnerable. Little is known of the distribution of Pacific lamprey. They may be present in some of the streams in the project vicinity (Unterwegner pers. comm.).

3.4.3.4 Non-Listed Fish Species

Several other species are present, or may be present, in flowing portions of streams in the project vicinity, including redband trout, red sided shiner, largescale sucker, bridge lip sucker, long nose dace, speckled dace, torrent sculpin, and mottled sculpin.

3.4.4 Environmental Consequences—Proposed Action

3.4.4.1 Definition of Impact Levels

- Impacts to fish from the proposed project would be considered **high** if they caused take or harm of a federally-listed or proposed threatened or endangered fish species, or had a long-term adverse effect on the populations, habitat, or viability of sensitive fish species.
- Impacts to fish from the proposed project would be considered **moderate** if they caused a short-term reduction in the quality and quantity of aquatic resources.

- Impacts to fish from the proposed project would be considered **low** if they caused a minor and temporary reduction in the quality and quantity of aquatic resources or habitats.

3.4.4.2 Impacts during Construction

No impacts on fish or other aquatic resources are expected during construction of either phase 1 or phase 2 of the proposed project. Because no fish-bearing streams are located on the project site, neither fish nor fish-bearing streams would be directly impacted during construction. The only potential impact would occur if creeks draining the project site experienced changes in water flow patterns or water quantity/quality, thus indirectly affecting reaches of creeks downstream. However, as described in Section 3.7 for water resources, such impacts are not probable. In addition, the project would have no effect on downstream woody debris, seed deposition, nutrient cycling, or other key fish habitat components. The proposed action includes several best management practices to protect water quality and prevent erosion, which would in turn protect fish. Therefore fish are not likely to be adversely affected by construction of either phase of the proposed project.

Neither phase 1 nor phase 2 construction is likely to adversely affect fish species listed under the ESA or otherwise result in violations of local, state, or federal regulations related to fish and fish habitat.

3.4.4.3 Impacts during Operation, Maintenance, and Decommissioning

Operation and maintenance would not adversely affect fish or other aquatic resources. Since fish-bearing streams are absent from where project activities would occur, only downstream impacts in streams receiving drainage from the project site are possible, and these are not likely to occur.

Therefore, project operation and maintenance is not likely to adversely affect fish species listed under the ESA or otherwise result in violations of local, state, or federal regulations related to fish and fish habitat.

Decommissioning impacts would be similar to those described earlier for construction; no impacts on fish are expected.

3.4.4.4 Mitigation

No mitigation measures are required because no adverse impacts on fish have been identified.

3.4.4.5 Unavoidable Impacts Remaining after Mitigation

No unavoidable impacts are anticipated.

3.4.5 Environmental Consequences—No Action Alternative

Under the No Action Alternative, fish in the project vicinity would continue to exist without the influence of the proposed project. However, other energy resources (most likely CTs) would be built in the region. These resources could be sited in areas with fish populations including threatened, endangered, or sensitive species.

3.5 Vegetation

3.5.1 Regulatory Framework

See Section 3.4.1 for discussion of the federal and Oregon state Endangered Species Acts and relevant portions of Gilliam County Code relating to vegetation.

3.5.2 Study Methodology

Vegetation studies were conducted as part of the URS avian study (described in Section 3.6) and confirmed in the field by Jones & Stokes botanists. The vegetation study area includes the ORE206 corridor from approximately 2 miles west of Condon (starting at Sniption Canyon) to MP 27, with a western extension to Ferry Canyon and an eastern extension to Tenmile Canyon at the northern portion of the area and the Hay Creek drainage in the central and southern portions of the study area. Vegetation was assessed based on field inspections and review of aerial photographs and the Gilliam County Soil Survey (SCS 1984).

3.5.3 Affected Environment

3.5.3.1 General Setting

Major vegetation types in the project area are shown in Figure 3.5-1. Cultivated winter wheat (*Triticum* spp.) and spring barley (*Hordeum* spp.) compose the dominant vegetation cover in the project site and study area. These croplands are dynamic in several ways. First, the fields are often fallow (not seeded) every other year, and this practice results in a changing mosaic of farmed and fallow fields. Second, planted fields change from a tilled and essentially barren soil in the fall to lush green fields of young wheat and barley in the spring and early summer, to tall fields of maturing grain in middle to late summer. At harvest, the fields are either mulched or left as stubble.

Where the broad hilltops begin to drop down into drainages, slopes quickly steepen. Some slopes that might still be arable in a technical sense have been converted to Conservation Reserve Program (CRP) status (described in Section 3.6.3.7) and planted with crested wheatgrass and like perennials. Other lands are too steep to farm with modern equipment, but were farmed in the early part of the century when horse-drawn plows could maneuver on the steep slopes. These areas support mixed native and non-native grass and shrub communities. Unimproved roads have been established throughout the area, and many follow the drainage bottoms.

The steepest lands have been little disturbed and support some high-quality native shrub-steppe communities (sagebrush and bunch grass), usually within the lower reaches of the drainage draws and away from cultivated areas. Three general shrub-steppe communities are present: big sagebrush (*Artemisia tridentata)*/bluebunch wheatgrass (*Agropyron spicatum)*, stiff sagebrush (*Artemesia rigida*)/Sandberg's bluegrass (*Poa sandbergii*), and big sagebrush/gray rabbitbrush (*Chrysothamnus nauseosus*)/annual grasses. These areas support relatively uncommon native plant communities, include cryptogamic crust, and provide important wildlife habitat. These three communities intermingle, reflecting changes in aspect, substrate, and magnitude of disturbance. In areas subject to grazing and farming, species composition of the native shrub/bunchgrass communities has been modified through introduction of invasive non-native species. These modified, semi-native plant communities are the typical shrub-steppe and grassland communities found within both the study area and the general vicinity. Much of the shrub-steppe, once dominant in Eastern Washington and Oregon, has been eliminated by agriculture and grazing.

3.5.3.2 Federally-Listed Species

In a letter dated September 22, 2000, the USFWS stated that no federally-listed endangered, threatened, proposed, or candidate plant species are known to exist within the project site or study area (Appendix B).

3.5.3.3 State-Listed Species

No state-listed plant species are present on the project site or in the study area. These areas are farmed or have otherwise been extensively altered. Some state-listed sensitive species may be present in the canyons and other non-farmed areas in the general vicinity. One state-listed and two candidate plant species have been found within a 10-mile radius of the project site (ONHP 2000):

- Laurence's milk-vetch (*Astragalus collinus* var. *laurentii*) is classified federally as a species of concern and by the state as a threatened species. This species occurs in basaltic grassland and sagebrush desert habitats (Meinke undated).
- Disappearing monkeyflower (*Mimulus evanescens*) is a candidate for state listing. It occurs in gravelly or rocky edges of reservoirs, lakes, or streambanks in the drying margins of receding waters.
- Hepatic monkeyflower (*Mimulus jungermannioides*) is listed as a federal species of concern and a candidate for state listing. It occurs in river canyons, on basaltic cliffs, or in small openings on cliffs, in areas that are kept moist by seeps.

None of these species has been reported in the study area.

3.5.3.4 Special Vegetation Resources

No special vegetation resources, such as high-quality native plant communities, are present on the project site. There is one small patch of high-quality native shrub-steppe in the northern portion of the study area near MP 28. This patch is outside the project site and would not be affected by the proposed project. No other special vegetation resources are known to occur on the project site or in the study area. Some wetland vegetation is present within four small seasonal wetlands located outside of the project site. See Sections 3.6.3.7 and 3.7.3.2 for further discussion of wetlands and vegetation types.

3.5.4 Environmental Consequences—Proposed Action

3.5.4.1 Definition of Impact Levels

- Impacts to vegetation from the proposed project would be considered **high** if one or more high-quality native plant communities were permanently removed, the soil was compacted so that plant root systems were destroyed, noxious weeds were spread, or a federally-listed plant species was taken without effective mitigation.
- Impacts to vegetation from the proposed project would be considered **moderate** if one or more high-quality native plant communities were temporarily disturbed, the soil was compacted but the topsoil and root system remained intact, or a federally-listed plant species was taken, but the loss could be mitigated through habitat enhancement, translocation, or other measures approved by the USFWS.

- Impacts to vegetation from the proposed project would be considered **low** if one or more high-quality native plant communities were temporarily disturbed without displacing the root system or compacting soils.

3.5.4.2 Impacts during Construction

The project would result in low impacts on vegetation. Vegetation affected by the project would include agricultural cropland, CRP designated parcels, and shrub-steppe. No high-quality native plant communities would be disturbed.

Approximately 30 acres of agricultural cropland (primarily used for winter wheat and spring barley) would be temporarily disturbed during construction of phase 1. The permanent footprint of phase 1 would occupy about 12 acres of this cropland. Similarly, construction of phase 2 would temporarily disturb about 34 acres of agricultural cropland, with a permanent (project life) footprint of 13 acres of cropland. Thus, the total project (phases 1 and 2) would temporarily disturb approximately 64 acres of cropland during construction, with about 25 acres of cropland remaining in the permanent footprint for the 20-year project life.

Approximately 14 acres of CRP land (the total CRP land on the project site) would be temporarily disturbed during construction of the project (4 acres in phase 1 and 10 acres in phase 2), with approximately 5 acres permanently impacted (2 acres in phase 1 and 3 acres in phase 2). The temporarily disturbed CRP land could be returned to CRP following construction, if the landowner so desired. The permanent (project life) disturbance to CRP land represents about 36 percent of the total CRP land on the project site, and about 1 percent of the total CRP land in the study area.

Phase 1 construction would temporarily disturb approximately 0.7 acres of non-high-quality shrub-steppe, with about 0.3 acres remaining in the permanent (project life) footprint. Likewise, construction of phase 2 would temporarily disturb about 1.5 acres of non-high-quality shrub-steppe, with approximately 0.6 acres remaining in the permanent footprint. Thus, the total project (phases 1 and 2) would temporarily disturb approximately 2.2 acres of non-high-quality shrub-steppe vegetation, and permanently occupy about 0.9 acre of shrub-steppe for the 20-year project life. The permanent disturbance to non-high-quality shrub-steppe represents less than 1 percent of the total shrub-steppe in the study area.

Potential impacts to vegetation include removal or trampling and soil compaction from crew activity and construction equipment. The project is not likely to adversely affect plant species listed under the ESA (since none are present) or otherwise result in violations of local, state, or federal regulations related to vegetation.

The proponent has committed to containing construction primarily within areas that are private farmland and that are used for non-irrigated agriculture (primarily spring barley and winter wheat), cattle grazing, or CRP land. Pole and electrical line installation equipment would be kept on ORE206, poles would be sited to avoid common shrub-steppe vegetation along the south side of ORE206, and any exposed soil would be revegetated with a seed mix after pole placement. Project facilities, including wind turbines, the O&M building, substation, access roads, and power lines, would impact a new permanent footprint of approximately 21 acres for phase 1 and an additional 17 acres for phase 2. Temporary disturbance would be approximately 58 acres for phase 1 and 45 acres for phase 2. Temporarily disturbed areas would be revegetated after construction.

Some of the project access roads are existing farm roads that would be resurfaced and/or relocated for project use, while the balance of project access roads would be new. During construction, the temporary disturbance width of project access roads would be about 50 feet. The project access roads would have a finished width of 12 to 14 feet and the balance of the construction disturbance area

would be revegetated. Access roads would be located mostly within agricultural lands, and high-quality native habitats would not be affected.

Electrical power lines required for the project are not expected to cross any sensitive high-quality native habitats or treed areas (since specific transmission line locations have not yet been established, this impact is considered possible).

Construction would temporarily disturb soils, creating opportunities for colonization by noxious weeds or other undesirable plants. Gilliam County's Weed Control Program utilizes the State of Oregon's Noxious Weed List for implementing weed management strategies. Yellow starthistle (*Centaurea solstitialis*) is the primary noxious weed in the county (Farrar pers. comm.).

3.5.4.3 Impacts during Operation and Maintenance

Little or no impact on vegetation is expected during operation because activities would occur within established roads and turnarounds. One potential impact to native vegetation would be the risk of fire. However, since roads would be maintained free of vegetation, turbines would be located on cleared pads, and turbines are not an ignition source, the overall risk of fire is low. The primary concern for fire would be if vehicles regularly drove over grasslands (particularly cheatgrass) during the dry periods of summer. Standard precautions would serve to minimize this potential impact (see the mitigation described later in this section).

Project facilities, including wind turbines, the O&M facility, the substation, access roads, and power lines, would occupy a new permanent footprint of approximately 21 acres for the first phase and an additional 17 acres for the second phase, for a project total of 38 acres. These acres would not support vegetation during the life of the project.

Areas along the edge of project roads, pads, and facilities would be vulnerable to weed infestations brought in on vehicle tires, and it is possible that weeds could spread into native communities downwind if left uncontrolled. However, herbicides, if needed, would be used at landowner request to minimize the potential for introduction of weeds into adjacent cultivated areas. Herbicides would be applied in observance of all regulations governing use and selection of herbicides, either by the landowner or, after consultation with the landowner, by a contract professional.

3.5.4.4 Impacts during Decommissioning

Low vegetation impacts would be expected during project decommissioning and would be similar to those during construction. Site reclamation may include regrading, spot replacement of topsoil, and revegetation of project-disturbed areas that would not be used immediately for plow-based agriculture. Project access roads would be reclaimed or left in place based on landowner preference. The land would then revert exclusively to landowner control, and the cropland and CRP land could be returned to agricultural use.

3.5.4.5 Mitigation

Should the project proceed, the following measures would help minimize potential vegetation impacts:

- All project vehicles will be equipped with basic fire-fighting equipment, including extinguishers, shovels, and other equipment as deemed appropriate (such as tools for fighting grass fires).

- Due to the rarity of trees in the area, no trees will be removed. In the unlikely event that tree removal is unavoidable, new trees will be planted at a ratio of five trees for every tree lost that has a diameter greater than 4 inches.
- Construction corridors will be marked within shrub-steppe plant communities in the vicinity of construction areas to minimize disturbance of this vegetation type.
- Construction equipment will be limited to construction corridors and to designated tower and building construction/staging footprints within cropland and CRP land.
- Electrical power poles will be placed to minimize impacts on shrub-steppe vegetation and any exposed soil will be revegetated after poles are installed.
- Revegetation guidelines will be prepared and implemented for areas that would be disturbed during construction, with guidelines as to whether native or non-native seed mixes would be used.
- To minimize establishment of noxious weeds, construction crews will limit transport of seeds to agricultural lands from roadside areas by complying with the Weed Management Control and Response Plan.
- SeaWest or its successor will prepare and implement a Weed Management Control and Response Plan, to be approved by the Gilliam County Weed Control Board. Weed management will include monitoring site facilities annually for infestation by noxious weeds. Weeds will be controlled in consultation with local landowners. Any infestation of noxious weeds will be addressed within 2 weeks and reported to the appropriate staff at the Gilliam County Weed Control Board.
- To minimize opportunities for weed infestations, exposed soils will be reseeded with a seed mix approved by the Natural Resources Conservation Service and/or reestablished as cropland after construction is complete.

3.5.4.6 Unavoidable Impacts Remaining after Mitigation

Small portions of common native plant communities could be disturbed during construction and decommissioning of the proposed project. A small number of semi-native shrub-steppe community plants (primarily Idaho fescue or bluebunch wheatgrass) would be permanently lost where poles are placed for the electrical connection lines along ORE206 between MP 34 and MP 39. In addition, in locations where access roads, towers, the O&M building and substation are sited within CRP land, development of grass and shrub plant communities within the footprints of these facilities would not occur.

3.5.5 Environmental Consequences—No Action Alternative

With the No Action Alternative, vegetation in the project site, study area, and vicinity would not be influenced by the proposed project. Other resources likely to be built in the region would have a greater impact on vegetation. For example, CTs use an average of 4.35 acres of land per MW for the generator, the development and extration of natural gas, and the construction of gas pipelines. The significance of such impacts would depend on the location and design of the CT.

3.6 Wildlife

3.6.1 Regulatory Framework

See Section 3.4 for discussion of the federal and Oregon state Endangered Species Acts and relevant portions of Gilliam County Code relating to wildlife. The following regulations also apply.

3.6.1.1 Migratory Bird Treaty Act (16 U.S.C. §§ 703-712, July 3, 1918, as amended 1936, 1960, 1968, 1969, 1974, 1978, 1986 and 1989)

The Migratory Bird Treaty Act (MBTA) implements various treaties and conventions between the United States and other countries, including Canada, Japan, Mexico, and the former Soviet Union, for the protection of migratory birds. Under the MBTA, taking, killing, or possessing migratory birds or their eggs or nests is unlawful. Most species of birds are classified as migratory under the MBTA, except for non-native birds such as pheasant, chukar, gray partridge, house sparrow, European starling, and rock dove.

The MBTA allows few exemptions, such as waterfowl hunting. Many types of development result in take of migratory birds: collision with windows, for example, is a leading cause of death among songbirds. Take may be allowed under a scientific permit if research is deemed beneficial to migratory birds.

3.6.1.2 Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds

This Executive Order directs each federal agency that is taking actions having or likely to have a negative impact on migratory bird populations to work with the USFWS to develop an agreement to conserve those birds. The protocols developed by this consultation are intended to guide future agency regulatory actions and policy decisions; renewal of permits, contracts or other agreements; and the creation of or revisions to land management plans.

3.6.1.3 Bald Eagle Protection Act (16 U.S.C. §§ 668-668d, June 8, 1940, as amended 1959, 1962, 1972, and 1978)

The Bald Eagle Protection Act (BEPA) prohibits the taking or possession of and commerce in bald and golden eagles, with limited exceptions such as for scientific research or for Native American religious purposes. Because a small number of bald eagles reside within foraging distance of the proposed project, some mortality of bald eagles could possibly result. However, because BEPA covers only intentional acts, or acts in "wanton disregard" of the safety of golden or bald eagles, this project is not viewed as subject to its compliance.

3.6.2 Study Methodology

A four-season avian study was conducted by URS, Inc., using standardized point counts (Appendix C). URS prepared a study plan in consultation with USFWS and ODFW. Both agencies were provided with copies of the plan prior to its initiation.

The avian study area included 16 observation stations established in the study area and vicinity. Biologists surveyed each station an average of 10 times per season. Information recorded included the names of species observed, their numbers and activities, the height of their flight and its direction, species habitat characteristics, and prevailing weather conditions.

Results of point counts were tallied to compile a list of species observed and to establish comparative abundance among survey points, seasons, and other wind resource areas where similar studies have been conducted.

Searches for raptor nests were conducted within a 10-mile radius from point count stations. Helicopter sweeps and ground-based searches were used to identify nest site locations within suitable habitats.

Bat surveys were conducted in July and September 2000, by Hayes and Waldien (2000) using nets that catch flying bats, instruments that detect bat echo-location calls, and visual ground searches for potential roosting and foraging habitat. The July surveys focused on resident bats and the September surveys focused on migrating bats. In addition, September was a good indicator of the availability of water resources for bats throughout the summer. The results of those surveys are presented in the URS Ecological Baseline Study (URS 2001).

Other information sources include data from the Oregon Natural Heritage data system and interviews with area wildlife biologists and local residents.

3.6.3 Affected Environment

This section discusses federally-listed species, state-listed species, bat populations, avian groups, game species, and common wildlife species other than birds or bats. The section also includes a discussion of special wildlife habitat types. The general setting of the study area is described in Section 3.4.

3.6.3.1 Federally-Listed Species

In a letter dated September 22, 2000, the USFWS identified the bald eagle as the only wildlife species listed as threatened or endangered that is known to occur in the vicinity of the proposed project (Appendix B). No occurrence has been reported for the study area, and no threatened species were observed during the avian study.

The study area contains marginal habitat for bald eagles, and the project site contains no typical bald eagle habitat. Bald eagles travel large distances in search of food and likely fly over the study area and project site sporadically during their travels or during searches for cattle or deer carcasses and other carrion. When a large carcass is available, bald eagles may stay in an area for several days. The most likely time for bald eagles to enter the study area or project site would be from late fall to early spring. During spring and summer, bald eagles tend to stay near nest sites, which are almost always located near large bodies of water. No nest sites are near the study area, nor is habitat typical of bald eagle nest sites; therefore, bald eagles are not expected to occur in the study area from mid-spring through summer.

Bald eagles regularly winter along the Columbia River (approximately 25 miles north of the study area), the John Day River (approximately 10 miles west), and Rock Creek (approximately 13 miles east). Bald eagle winter use of the study area would be sparse and sporadic. No communal winter roost habitat (areas where bald eagles spend the night communally, used only in winter) is present. Bald eagles in the region would normally be expected to stay near these wintering areas located 10 to 25 miles from the project site.

3.6.3.2 State-Listed Species

Several state-listed species potentially occur in the study area (Table 3.6-1). Grasshopper sparrow, long-billed curlew, Swainson's hawk, loggerhead shrike, sage sparrow, and silver-haired bat were observed during the avian or bat surveys. Other state-listed species, such as olive-sided flycatchers and bank swallows, may fly through the study area during migratory periods.

Table 3.6-1. Oregon Natural Heritage List of Sensitive Animal Species Known to Occur in Gilliam County

Common Name	Observed During Site Surveys	State Rank	Federal Status
western burrowing owl		S2 (breeding population imperiled in Oregon)	Species of Concern
grasshopper sparrow	X	S2 (imperiled in Oregon)	None
Washington ground squirrel		S2 (imperiled throughout its range)	None
western small-footed bat		S3 (rare, threatened or uncommon in Oregon)	Species of Concern
bald eagle		S3 (breeding population rare, threatened or uncommon in Oregon) S4 (winter population, not rare, apparently secure in Oregon)	Threatened
Swainson's hawk	X	S3 (breeding population, rare, threatened or uncommon in Oregon)	None
pale western big-eared bat		S3 (rare, threatened or uncommon in Oregon)	Species of Concern
Pacific western big-eared bat		S3 (rare, threatened or uncommon in Oregon)	Species of Concern
long-legged bat		S3 (rare, threatened or uncommon in Oregon)	Species of Concern
ferruginous hawk		S3 (rare, threatened or uncommon in Oregon)	Species of Concern
long-billed curlew	X	S3 (rare, threatened or uncommon in Oregon)	None
long-eared bat		S3 (rare, threatened or uncommon in Oregon)	Species of Concern
loggerhead shrike	X	S4 (breeding population, not rare, apparently secure in Oregon) S2 (non-breeding population imperiled in Oregon)	None
silver-haired bat	X	S4 (not rare, apparently secure in Oregon)	Species of Concern
western toad		S4 (not rare, apparently secure in Oregon)	None
sage sparrow	X	S4 (not rare, apparently secure in Oregon)	None
white-tailed jackrabbit		S4 (not rare, apparently secure in Oregon)	None
northern sagebrush lizard		S5 (widespread, abundant and secure in Oregon)	Species of Concern
Source: Oregon Natural Heritage Program 2000			

3.6.3.3 Bat Populations

Bat Breeding/Year-Round Resident Use

Bat surveys conducted with the avian study confirmed the presence of big brown bat and silver-haired bat, as well as bats in the genus Myotis (likely little brown myotis and California myotis). The state assigns the silver-haired bat's status as sensitive/undetermined.

The bat surveys indicate that most bat activity in the project vicinity occurs in canyons rather than on the ridgetops where turbines would be installed. Resident bats were found to concentrate foraging activities within the Tenmile Canyon, Hay Creek, and Ferry Canyon drainages and at constructed ponds scattered throughout the project vicinity. Wheat fields and side slopes appeared to receive little use.

In general, important bat habitat such as roost sites (where bats rest) and foraging areas could be provided by the scattered trees and farm buildings in the project vicinity, and in isolated rock outcrops in Ferry and Tenmile Canyons.

Migrant Bat Use

Little published information is available regarding migrating bats. Several species of bats historically migrate through Oregon in the fall and spring. The project site lacks trees and other roosting habitat and has relatively dry conditions. This lack of habitat would likely result in most migrating bats flying through the site instead of stopping to roost or feed. The silver-haired bat was detected in the September survey, and is very likely a migrant.

Wintering Bat Use

Bats are either in hibernation or absent from the project site and study area during winter (Barbour and Davis 1969).

3.6.3.4 Avian Groups

Passerines

Passerines include birds commonly referred to as perching birds or songbirds. Passerines are generally small birds, and the category includes flycatchers, larks, swallows, crows, magpies, warblers, shrikes, finches, sparrows, and others.

Passerine Breeding/Year-Round Resident Use

Horned lark, western meadowlark, vesper sparrow, and Brewer's blackbird are by far the most common species of any avian group in the study area. They occur throughout the year and accounted for over three-quarters of all bird observations during the avian surveys. The horned lark, western meadowlark, vesper sparrow, and Brewer's blackbird accounted for 71 percent, 53 percent, and 33 percent of birds detected in summer, fall, and winter avian surveys, respectively. Most birds detected in winter were unidentified passerines (47 percent). These species are well adapted to open cropland and adjacent habitats and occur in similar habitats throughout the Columbia Basin.

Migrant Passerine Use

Large flocks of migrating passerines were not observed during the avian survey completed for this evaluation. However, based on local birding reports, several types of passerines migrate through Gilliam County (LaFaive 2000). Bluebirds and flocks of robins are known to fly through Gilliam

County during spring and fall. Many other passerine species may migrate through the area because migration paths are spread over a wide area throughout Oregon.

Several species of passerines are reported to travel and stop in relatively large flocks (more than 20 individuals) in Gilliam County, including sparrows (vesper, savannah, white-crowned, chipping), horned larks, American goldfinches, water pipits, and mountain bluebirds. Sparrows can occur in very large flocks throughout Gilliam County during migration. Even some forest-associated birds fly through the area, including western tanager and several species of warblers (LaFaive 2000).

Most passerines undertake long-distance migration flights at night, typically flying at altitudes well above the highest reach of wind turbines (Bellrose in Alerstam 1990). However, flight altitudes do occasionally fall within the height of wind turbines, and mortality of migrating passerines has been reported at existing wind resource areas (Johnson, Wallace et al. 2000; Erickson et al. 2000), although no large mortality events like those reported for communication towers (Kerlinger 2000) have been reported at wind projects.

Passerine migration through the study area is believed to be moderate. The area is located between known breeding areas to the north and known wintering areas to the south. The Columbia Basin is a major breeding area for waterfowl and raptors, and southeastern Oregon is a major wintering area. Many other types of birds from Washington, British Columbia, and Alaska fly through Oregon during migration.

Most migrants are expected to fly past the study area above turbine height rather than lingering to feed or rest. This is because the study area contains little cover or food that may attract migrants to land. As a general rule, migrating passerines often land during the day to feed, drink water, and rest, and they may travel for periods at low altitudes. However, the study area does not contain forest, extensive wetlands, or other habitats that would be expected to attract large flocks of migrating passerines to land.

Hawks and Eagles

Hawk and Eagle Breeding/Year-Round Resident Use

Northern harriers were regularly observed during the avian survey. These birds are well suited to agricultural lands. They hunt by flying low along the edges of fencerows and grassy areas, and such habitats are abundant in the study area.

American kestrel was the most commonly observed raptor during the field studies (URS and WEST 2001). Red-tailed hawk was the second most commonly observed raptor in the study area.

Swainson's hawks, listed by the state as a sensitive/vulnerable species, were observed soaring and flying at the project site during spring and summer. A total of seven observations were made during the spring surveys (with one pair siting) and two during summer surveys. Swainson's hawks hunt mostly from the air and are less reliant on perches than red-tailed hawks. However, the nearest Swainson's hawk nest site observed is located more than 3 miles from the project site.

Golden eagles are known to forage within canyons in the general project vicinity. The nearest nesting site found during the nest survey was over 12 miles from the project site. The avian studies resulted in 17 golden eagle observations in the study area during summer and fall; however, all observations were outside the areas where turbines would be placed.

Migrant Hawk and Eagle Use

As with other bird species, migrating raptors are expected to travel through Oregon in a relatively broad front rather than concentrating in any particular area. Surveys did not find major increases in raptor observations during spring or fall.

Species observed as part of the avian surveys during the hawk migration season were American kestrel, northern harrier, red-tailed hawk, rough-legged hawk, Cooper's hawk, prairie falcon, and golden eagle. Other species not observed but reported to migrate through the general vicinity include northern goshawk, sharp-shinned hawk, merlin, peregrine falcon (formerly listed as endangered but since delisted), and osprey.

Wintering Hawk and Eagle Use

Rough-legged hawks are common winter residents in the study area. These birds nest in the Arctic tundra and winter in southern Canada and the northern United States. Like red-tailed hawks, rough-legged hawk activity was found to be highest along areas with perch structures, including along ORE206. As stated earlier under "Federally-Listed Species," bald eagles may occur rarely in the vicinity during winter.

Owls

Breeding/Year-Round Resident Owl Use

Based on habitat, short-eared and barn owls would be relatively common breeders and residents in the general project vicinity, although the avian surveys resulted in only one short-eared owl observation and no barn owl observations. Barn owls typically use human structures for nesting, whereas short-eared owls nest in dense shrub and grass habitat. Great horned owls are also present in the general project vicinity. A great horned owl nest was found 10 miles east of the project area during the spring aerial surveys. These birds next in trees or rimrock areas. The study area also lies within the range of western screech owls and burrowing owls, but none were sighted during the avian surveys.

Migrant Owl Use

Several species of owl may migrate through the project vicinity, including two species that also may reside in the study area (e.g., saw-whet and short-eared owls). The only migratory owl detected during the avian surveys was the short-eared owl.

Wintering Owl Use

In addition to year-round resident owls, snowy owls are expected to be occasional visitors in the general project vicinity, since it lies within the range of snowy owls (Johnsgard 1988). Snowy owls were reported in November and December 1996 near Condon (Oregon Birders Online 2001). Snowy owls were not detected during the avian field survey.

Shorebirds

The long-billed curlew, classified by the state as a sensitive/vulnerable species, and killdeer, a common species, are the only shorebirds known to occur in the general project vicinity. Both migrant and resident populations occur. Long-billed curlews form flocks in mid-summer after chicks have fledged, and such flocks are likely to travel through the general project vicinity. Seven individual observations of long-billed curlews were made during the avian surveys.

Waterfowl/Cranes

Waterfowl/Crane Breeding/Year-Round Residents

Few waterfowl breed in the study area and general project vicinity, although the canyons and other drainages in the vicinity probably provide nesting and foraging habitat. Canada geese were observed during summer and fall avian surveys in 2000. Geese are grazers, feeding in wheat fields, pastures, and other areas containing grasses and forbs (non-woody plants).

Migrant Waterfowl/Crane Use

Waterfowl are expected to move through the general project vicinity in late fall. The project vicinity is too dry to attract many wetland birds, but migrating flocks of geese or wigeons (a type of duck) may stop in the study area croplands to feed. A few flocks of ducks and geese were noted in the avian surveys during the fall migration period, but overall, the amount of activity appears relatively low. During fall 2000, one large and one small flock of sandhill cranes, totaling 103 birds, were observed migrating over the study area.

Winter Waterfowl/Crane Use

Canada geese and other types of waterfowl winter in the John Day River area and may travel to uplands, such as those present in the study area, to feed. No water fowl were found wintering in the study area during the avian surveys.

Other Bird Groups

Mourning doves are relatively common in the study area based on avian surveys. Swifts and hummingbirds are rare because of a general lack of habitat.

3.6.3.5 Game Species

Mule deer are common throughout eastern Oregon, including the study area and vicinity, typically feeding along the edges of wheat fields during spring and fall when plants are green and succulent. During summer, they are not likely to be in the study area, as they most often appear near cover and near irrigated alfalfa fields (not in the study area) or on steep, north-facing slopes where they find shade and cover. In winter, they tend to form groups and concentrate in areas with southern exposures, vegetation (non-wheat fields such as CRP, range, and remnant native vegetation), and substantial isolation from human activity.

Pronghorn antelope are also present in the general project vicinity, although they are more common in the high-desert region of central Oregon.

In the general project vicinity, chukar are common along slopes, while gray partridge and California quail are expected in shrubby habitats near wheat fields. Ring-necked pheasant would be expected along drainage bottoms that provide thick cover.

3.6.3.6 Common Animal Species (Other than Birds and Bats)

Common wildlife species expected to occur in the general project vicinity include mule deer, pronghorn antelopes, cottontails, coyotes, foxes, badgers, bobcats, yellow-bellied marmots, gophers, skunks, ground squirrels, voles, deer mice, pocket mice, pocket gophers, and snakes. Cougars may also occasionally move through the general project vicinity to feed on deer, particularly in winter. Most wildlife activity would be expected to occur on uncultivated lands throughout much of the year, although deer, pronghorn antelopes, voles, snakes, and mice may feed in wheat and barley fields.

3.6.3.7 Special Habitat Types

Conservation Reserve Program Lands

The CRP lands in the project site and study area are shown in Figure 3.5-1. The CRP is a federal program, administered by the Natural Resources Conservation Service (NRCS), to encourage farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as grasses, wildlife plantings, trees, filter strips, or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract. Cost sharing helps to establish the vegetative cover practices. The program reduces soil erosion, reduces sedimentation in streams and lakes, improves water quality, and establishes wildlife habitat.

CRP lands in the project site and study area provide habitat for snakes and small mammals, which in turn attract raptors and other predators. Several species of common birds may also nest in these lands, and upland birds may use these areas throughout the year. The CRP lands can also provide important winter range for several types of wildlife, including mule deer.

Trees

No trees are present on the project site, and trees are scarce in the study area, except for a few scattered groves or individual trees usually associated with current or former farms. Black locust (*Robinia pseudo-acacia*) is the most common species. Such upland trees provide habitat for nesting and roosting birds and bats, and they are essential to Swainson's hawks because suitable nest trees are often the limiting factor to the species' distribution and abundance. Trees may also provide forage for browsing mule deer and antelope.

Riparian Habitats

Riparian habitats with trees are not present on the project site and are very rare in the study area and project vicinity. Black cottonwoods (*Populus angustifolia*) may occasionally occur within riparian drainages in the general project vicinity. Due to the scarcity of riparian habitats with trees, these areas are important to wildlife, including birds, bats, and large mammals.

Riparian vegetation other than trees occurs as narrow strips along drainage bottoms in the project vicinity. In drier drainages, plant species composition is often similar to the adjacent upland communities, although the riparian plants grow taller and in greater density.

Shrub-Steppe Habitats

Shrub-steppe is an essential habitat for many native species, including species classified as sensitive by the state such as sage sparrow and loggerhead shrike. Many other species rely on this habitat, particularly during winter when little other cover is available.

The general project vicinity supports three types of shrub-steppe: big sagebrush/bluebunch wheatgrass, stiff sagebrush/Sandberg's bluegrass, and big sagebrush/gray rabbitbrush/annual grasses. Shrub-steppe communities were dominant prior to European settlement of the area. In areas subject to grazing and farming, species composition of the native shrub/bunchgrass communities has been modified through introduction of invasive non-native species.

Water Bodies

The project site, study area, and general project vicinity are dry, receiving less than 16 inches of precipitation per year. Because of this dry condition, water is one of the major limiting factors to

many types of wildlife. Surface water—even if available only in the spring—may be critical for maintaining populations of amphibians in the drainage bottoms, including great basin spadefoot (a toad), and western toad, a state sensitive species.

No wetlands are present on the project site. One 0.1-acre wetland is present in the northern portion of the study area near MP 28; a few ephemeral (seasonal) wetlands are scattered throughout the general vicinity just outside the study area (Figure 3.5-1), and all of these sites were dry during field studies conducted in July 2000. One pond located just outside the study area is believed to hold water throughout the year. Section 3.7 provides more information regarding the wetlands in the project vicinity.

Other sources of water outside the project site and study area but in the general project vicinity include a small stream in Tenmile Canyon, which was flowing through September 2000, and small pools in the upper reaches of Ferry Canyon off Alville Road that appear to persist throughout the summer months. The lower reaches of Ferry Canyon were found to be dry during the September field visit.

Human Structures

The human structures scattered over the study area provide important wildlife habitat. Existing utility poles provide perches for species such as golden eagle, red-tailed hawk, American kestrel, and rough-legged hawk. Raptors were observed during site surveys perched on BPA transmission line towers and local distribution line poles along ORE206. Wooden fence posts and similar fence structures scattered throughout the study area also provide perching habitat for hawks and other types of birds. Abandoned homesteads and associated trees in the study area provide hiding and nesting cover for a variety of wildlife, including dusky woodrats, yellow-bellied marmots, skunks, snakes, and lizards.

3.6.4 Environmental Consequences—Proposed Action

Potential impacts to raptors and other birds using the study area include collision with wind turbines, loss of habitat, disturbance to foraging and breeding behavior, collision with overhead power lines, and electrocution. Project-related human activity could alter bird behavior during the construction phases of the project, and the post-construction density of turbines in the developed portion of the site may alter avian use.

Several elements of the project design would help reduce the potential for impacts to birds, and reflect the state-of-the-art knowledge about minimizing impacts to raptors and other bird species. First, avian use in the study area is very low. Siting the project in an area with low bird use is the most fundamental way to reduce avian impacts. Beyond that, the project design incorporates a number of features that would reduce avian impacts. The use of tubular turbine towers rather than lattice towers minimizes bird perching or nesting opportunities. The slow moving rotation of the turbine blades (approximately one revolution every two seconds) increases the visibility of the blades compared to faster-moving turbine models. Turbines are proposed to be set back from the upwind side of ridges and would be located on the top or downwind sides. Turbines would not be located in low saddle areas between drainages. Research has indicated higher raptor use along the upwind side of ridgelines. Also, where feasible, transmission facilities would be located underground to reduce the number of locations near turbines where birds may be attracted to perch.

3.6.4.1 Definition of Impact Levels

- Wildlife impacts would be considered **high** if the project had an unavoidable adverse effect on a federally-listed threatened or endangered animal species, substantially reduced the quantity or

quality of a regionally or nationally significant wildlife population or habitat, substantially reduced the quantity or quality of habitat critical for the survival of local populations (such as big-game winter range), or adversely affected rare or declining species at the regional level.

- Wildlife impacts would be considered **moderate** if a federally-listed animal species were taken but the loss was effectively mitigated through habitat enhancement, relocation, or other measures approved by the USFWS; if the project caused a local reduction in the quantity or quality of wildlife habitat (as opposed to regional reductions); or if it marginally reduced the productivity of adjacent wildlife habitats or resources (such as nest sites); or if individual animals were lost due to the project, causing local population reductions but having negligible effects at the regional level.
- Wildlife impacts would be considered **low** if the project temporarily disturbed common wildlife species, reduced habitat that is common in the project vicinity, or adversely affected relatively common species at a local level.

3.6.4.2 Impacts during Construction

Project construction would result in low impacts on wildlife. Construction would be consistent with regulations pertaining to wildlife. No threatened or endangered species or migratory birds would be harmed or harassed, nor would critical or essential habitat for such species be altered. Avian and bat mortality would not occur from construction activities.

Construction noise and activities would cause some animals to avoid areas of active construction. In general, such avoidance is a concern only under very specific situations, such as disturbance of a nest site or other breeding areas where animals cannot readily relocate. This impact is unlikely because the nearest raptor nest site observed was more than 3 miles from the project site, and the proponent has committed to containing construction primarily within areas that are private farmland that is only marginally productive as habitat.

Special Habitat Types

Approximately 14 acres of CRP land would be disturbed during construction of the project. This is considered a low level impact because this represents less than 1 percent of the CRP land in the study area, causing a very small reduction in the availability of this habitat type in the study area.

3.6.4.3 Impacts during Operation and Maintenance

Operation and maintenance of the proposed project would result in low to moderate impacts to wildlife. Specifically, some bat and bird mortality would be unavoidable.

Birds

With current technology, avian mortality from collisions with the turbines and meteorological tower guy wires is an unavoidable consequence of wind resource development such as the proposed project. It follows that some avian mortality would occur at the project site over the life of this project. The average number of birds killed per year for the proposed project from collisions with wind turbines is expected to be in the range of 25 to 50 individuals for phase 1, and an additional 25 to 50 individuals for phase 2 (0.57 to 0.88 birds/turbine/year). This average is based on average per-turbine impacts reported at two similar wind projects—the Vansycle (Umatilla County, Oregon) and Buffalo Ridge (Minnesota) wind resource areas—where a combined total of 5 years of mortality data have been systematically gathered. These two projects are appropriate for comparison to the proposed project since (1) they use similar turbine designs (tubular steel towers, relatively large rotor diameter and

height); (2) they are located in open agricultural areas; (3) they are located on ridges perpendicular to the primary wind direction; and (4) raptors and other birds occur in similar abundance.

Turbines at the Vansycle site are approximately 165 feet tall at the turbine hub and approximately 245 feet tall including the turbine blades. Studies at the Vansycle site found a mortality rate associated with wind turbines of 0.63 birds/turbine/year. In the first year of monitoring, 12 avian fatalities were found, of which 7 (58 percent) were passerines. White-crowned sparrow, which also occurs at the proposed Condon site, was the most common species found. Based on the time period, it is likely that the white-crowned sparrows were migrating through the area, although resident passerines were also found. Gray partridge (an upland game bird that also occurs at the Condon project site) was also found to be vulnerable to collisions, which was somewhat surprising since this species usually flies close to the ground, well below the height of wind turbine blades.

Two turbine types are in service at the Buffalo Ridge site. The Kenetech Model 33 M-VS turbine is installed on top of a 118-foot tubular tower and has a blade diameter of 108 feet. The rotor-swept height of the turbine is therefore approximately 64 to 172 feet above ground. The Zond Model Z-750 turbine is installed on top of a 164-foot tubular tower. Two blade diameters are in use. With a 151-foot blade diameter, the rotor-swept height of the turbine is approximately 89 to 240 feet. With a 157-foot blade diameter, the rotor-swept height of the turbine is approximately 86 to 243 feet.

At the Buffalo Ridge site, the mean number of avian fatalities was 2.83 birds/turbine/year (Johnson, Wallace et al. 2000). As with Vansycle, most avian fatalities (just over 75 percent) were passerines. Other fatalities detected were waterfowl, waterbirds, upland gamebirds, shorebirds, and one raptor.

In addition to collisions with the project wind turbines, birds may also collide with the guy wires of the project's meteorological towers. Two to four permanent meteorological towers would be installed, primarily upwind of the turbine strings. The meteorological towers would be 197 feet high, with a concrete foundation and guy wire cable stabilization. Studies at a wind project at Foote Creek Rim, Wyoming, resulted in annual estimates of up to 7.5 avian fatalities per meteorological tower based on a 2-year study (Johnson et al. 2001).

While raptors were originally the major focus of concern for wind projects (Orloff and Flannery 1992), more recent studies suggest that this initial concern was primarily due to siting turbines in areas with high raptor populations and high prey density (such as Altamont Pass), and possibly the use of older technology (such as lattice towers that may attract perching by raptors). Also, earlier studies focused on finding large birds largely overlooked passerine fatalities (which are much harder to find). Now, as intensive searches for all birds (large and small) have been undertaken at modern facilities, the evidence suggests that hawks are relatively rare victims of collisions with wind energy facilities. Because of their typically large abundance relative to raptors, passerines are the more commonly observed fatality.

Due to the seasonal timing of reported fatalities, it appears likely that many of the fatalities are migrants, and most passerines migrate at night. A total of nine raptor nests were found within a 10-mile radius of the avian study area plots (1.4 nests/10,000 hectares). This density is extremely low compared to density found in similar surveys at other wind projects, including the Vansycle/Stateline wind site in Oregon (3.9-7.8 nests/10,000 hectares).

The study area does not contain key features typical of a major migration route. It is not at a meeting point of major flight barriers, such as seas and high mountain ranges, so birds are expected to move through the study area in a rather broad front, rather than in a concentrated flight path. The study area also does not contain forest, extensive wetlands, or other habitats that would attract large flocks of migrating passerines. Still, nocturnal migrants are likely to fly through this area during spring and fall migration (as any area in eastern Oregon) and a very small proportion of those flying through the

area might collide with proposed project turbines. The overall impact level on nocturnal migrant populations is expected to be minimal.

Species most likely to be impacted by the wind turbines and meteorological towers at the proposed project site, based on mortality studies at other sites, include migrating sparrows (vesper, savannah, white-crowned, chipping) and warblers, together with resident or breeding swallows, American kestrel, and chukar and/or gray partridge. Although individuals would be lost on a regular basis over the life of the project, this loss would not significantly affect overall population levels or cause a trend toward species becoming rare, threatened, or endangered. This is because the site is not likely a major flyway, and most migrants fly well above the heights that would put them at risk (Alerstam 1990). In addition, the data from the Buffalo Ridge site indicate that only a small fraction of migrating flocks are affected. Researchers at that site used radar studies to predict that over 3.5 million nocturnal migrants annually flew over the general vicinity of the project, yet the greatest number of estimated annual fatalities was in the range of 1,000 per year, or less than 3 fatalities for every 10,000 migrants. The Buffalo Ridge project has over 350 turbines. The amount of mortality at the proposed Condon project site, with much fewer turbines, is expected to compose a much smaller fraction of the migrating birds.

No single event where large flocks of birds are killed has ever been reported at a wind energy project. The largest mortality reported at a wind energy development in one day was 14 warblers found at two adjacent turbine structures at the Buffalo Ridge site.

Raptor mortality is likely to be low at the proposed site. The site supports similar or lower raptor use than the Vansycle and Buffalo Ridge sites, and both of those sites reported little or no raptor mortality. During some years, the Condon wind project may cause no mortality, while in other years mortality may be in the range of one to three individual hawks. American kestrel is the most likely raptor species to collide with the proposed turbines, based on its observed use of the project site and known risk factors. Golden eagles may be killed on rare occasions. Red-tailed hawks, rough-legged hawks, northern harriers, and other less common or migrant species may also collide with project turbines at some point over the life of the project, although the numbers are expected to be relatively low (averaging less than one among these species per year, extrapolating from data from Vansycle and Buffalo Ridge). This impact is considered low to moderate, since it would affect individuals, including sensitive species that have experienced widespread population declines, but it would not be likely to result in long-term, regional population declines.

The Condon wind project would not jeopardize the continued existence of any species listed under the ESA. Bald eagles, the only threatened wildlife species that occurs in the project site and study area, are not likely to be affected by the proposed project, since they rarely occur in the area and are not particularly vulnerable to collisions with wind turbines. No bald eagles were seen at the project site or study area during surveys, and onsite habitat conditions for bald eagles are poor. While bald eagles use a wide range of habitat types, open wheat fields are rarely used. Bald eagles are closely associated with large water bodies, and no such habitat is present within several miles from the site. To ensure ESA compliance, BPA would complete consultation with the USFWS under Section 7 of the ESA by submitting a biological assessment for listed species prior to committing to the project.

While bald eagles are not likely to be adversely affected by the project, it is possible that a golden eagle could occasionally be killed. Golden eagles are protected under the Bald Eagle Protection Act. Because golden eagles have collided with wind turbines at other sites, and because golden eagles were noted to occasionally fly within the project site, the possibility of mortality exists for this species. It is assumed that golden eagle mortality at the project site could occur, but at low rates (on the order of one fatality every several years). Turbines at the project site would be located away from the canyons where golden eagles would be expected to occur most frequently in the study area. The

individual fatalities would probably not affect regional population levels. While any fatality is certainly adverse, the overall effect on population levels would be negligible.

Mortality of bald eagles or other birds due to electrocution by electrical transmission facilities would be minimal. Modern electrical power lines and other transmission facilities are designed to prevent electrocution hazard to raptors or other birds by incorporating features such as perch guards, separation of wires, or line insulators. Designs would be consistent with the recommendations of the Avian Powerline Interaction Committee (1994) or equivalent specifications approved by ODFW.

Mortality of birds listed under the Migratory Bird Treaty Act could be treated by the U.S. Fish and Wildlife Service as a violation of this federal act, so appropriate mitigation measures would be employed to reduce the risk of mortality to a minimum (see mitigation later in this section). However, because the associated bird mortality would be an unintended or incidental occurrence, it is unlikely that this would be considered a "take" under the Migratory Bird Treaty Act.

Bats

Based on per-turbine estimates found at the Vansycle and Buffalo Ridge sites, annual bat mortality for the proposed project could be in the range of 30 to 80 individual bats for the first phase and an additional 30 to 80 individuals for the second phase. Individuals killed are most likely to be hoary, silver-haired, and little brown bats, based on the species found at the Vansycle site.

Bat fatalities at the Vansycle site were estimated to be 0.73 bats/turbine/year during the 1 year of monitoring completed there (Erickson et al. 2000). At Buffalo Ridge, estimated bat mortality is approximately 2 bats per turbine (1.78 bats/turbine/year at one study area and 2.04 at another). Mortality at Buffalo Ridge may have been higher because several turbines were located near wetlands, which are known to attract bats. At both the Vansycle and Buffalo Ridge sites, most bats that were killed were believed to be migrants (primarily hoary bats).

The proposed Condon project site is expected to have a similar or lower mortality rate than that reported at other wind resource areas because of low existing habitat values at the site and the lack of evidence that the Condon study area receives high bat use during migration. Habitat conditions at the study area are such that few migrating bats are expected to land to roost or feed near where turbines would be placed. The study area lacks the wetlands and roost sites that tend to attract bats.

Therefore, impacts to bats at the proposed Condon project site are expected to be low to moderate, since the species affected are not threatened or endangered and, while individuals would be taken, overall regional population levels are not likely to appreciably change.

General Wildlife

General wildlife impacts from the proposed project would be low. Use of the project site by birds and other wildlife may decline slightly due to the presence of turbines and associated operation and maintenance activities. Most species affected would be common. Minor reductions in avian use have been reported at other wind resource areas (such as Vansycle), and most animals are known to avoid human activity.

Special Habitat Types

The operation and maintenance of the project would have no effect on special habitat types.

3.6.4.4 Impacts during Decommissioning

Decommissioning of the project would involve low impacts on wildlife. Decommissioning would cause a temporary increase in noise and visual disturbance that would, in turn, temporarily reduce wildlife use of the project site and vicinity, although no threatened, endangered, or rare species would be affected. Dismantling the project would eliminate the bat and avian mortality caused by the presence of wind turbines. Subsequent to decommissioning, wildlife habitat at the project site would have the potential to return to pre-project conditions, including CRP land.

3.6.4.5 Mitigation

The following measures would be employed to minimize potential project impacts on wildlife:

- To prevent bald eagles from being attracted to the project site, project personnel and avian monitoring crews would look for large carrion (dead deer or cattle) on the project site between November 15 and March 31 of any given year. If found, large carrion would be relocated from the project site within 24 hours to similar habitats more than 2 miles from the closest turbine. Sites for such relocations would be identified by BPA.
- Due to inherent uncertainty in avian and bat mortality associated with the proposed project, and the need to further scientific understanding of avian and bat mortality associated with wind energy generation, the following monitoring standards will be implemented:

    1. SeaWest or its successor will monitor avian and bat mortality for the first year of the project's life, and submit a quarterly report to BPA, ODFW, and USFWS. The monitoring will follow standard protocols that have been established at other wind resource projects.
    2. SeaWest staff (or its successor) will maintain a record of all wildlife injury and mortality that is observed on the project site. This record will include a photographic record of injury and mortality using a standard protocol approved by ODFW and the USFWS.
    3. SeaWest or its successor will report, by telephone, injuries or mortalities of species listed in Table 3.6-1 (and any species listed in the future) to the designated BPA, ODFW, and/or USFWS representatives within 24 hours following observation.

3.6.4.6 Unavoidable Impacts Remaining after Mitigation

Unavoidable adverse impacts after mitigation associated with the proposed project include (1) an annual bird mortality of between 50 and 100, mostly among the passerine species, but including a few raptors; and (2) an annual bat mortality of between 60 and 160, most likely to be hoary, silver-haired, and myotis bat species.

3.6.5 Environmental Consequences—No Action

Under No Action, the project would not be built, and the wildlife of the study area would continue without influence of the proposed project.

3.7 Water Resources and Wetlands

3.7.1 Regulatory Framework

The Clean Water Act (CWA) regulates discharges into waters of the United States. In the state of Oregon, the Oregon Department of Environmental Quality (ODEQ) has responsibility for implementing the CWA.

3.7.2 Study Methodology

The study area evaluated includes the ORE206 corridor from approximately 2 miles west of Condon (starting at Sniption Canyon) to MP 27, with a western extension to Ferry Canyon and an eastern extension to Tenmile Canyon and the Hay Creek drainage (Figure 2.1-1).

Various sources were consulted to identify and assess water resources in the project site, study area, and general project vicinity, including Internet sources from StreamNet, Oregon Department of Fish and Wildlife (ODFW), National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), and Bureau of Land Management (BLM). U.S. Geological Survey maps, aerial photographs, the Gilliam County Soil Survey (SCS 1984), and personnel from ODFW and BLM were consulted, and Jones & Stokes personnel conducted field inspections in September 2000.

3.7.3 Affected Environment

The project site and study area are within one of the driest regions of the Pacific Northwest, generally receiving less than 16 inches of precipitation annually. Vegetation (mainly in drainages in the project vicinity) is of the shrub-steppe variety, reflecting a dry climate and harsh temperature extremes (Federal Register Vol. 64, No. 57, March 25, 1999).

3.7.3.1 Streams

No streams exist within the project site or study area, but several streams and drainages occur in the project vicinity, including Hay Creek to the west, Tenmile Canyon (which drains to Hay Creek) to the north, Ferry Canyon to the east, and Sniption Canyon (which drains to Thirtymile Canyon) to the south.

3.7.3.2 Wetlands

One very small (0.1 acre) seasonal wetland lies within the northern portion of the study area; however, this wetland is not within the area affected by construction. Three very small seasonal wetlands (totaling about 0.17 acres) are located within draws adjacent to the study area (Figure 3.5-1). All four of these wetlands are wet during late winter and spring and dry during summer.

3.7.3.3 Water Quality

Streams in the project vicinity typically exhibit poor water quality, including high temperatures, low oxygen levels, and pollution such as sediments, bacteria, fecal coliform, nutrients, and toxic effluents (BLM 1999). Water quality data are routinely collected by ODEQ in the John Day River Basin. In the Lower John Day River Subbasin, ODEQ monitors three locations. The monitoring site at the ORE206 bridge crossing (RM 39.5) is downstream of Thirtymile and Ferry Canyon but upstream of

Hay Creek. The monitoring site at McDonald Ferry is downstream of the study area (ODEQ web site).

3.7.3.4 Climate and Hydrogeology

The climate in the area is very dry (16 inches of precipitation annually), with most precipitation falling as snow. Winter months are cold with mean daily temperatures between 23 and 27°F. Freezing rain, snowstorms, ice fogs, and wind are common in winter, but extended periods of sun also occur. Late winter and early spring rainstorms can cause rapid snowmelt, resulting in high peak flows in drainages and streams and increased erosion. Summers are warm and dry with average daily highs ranging from 74 to 82°F, and drought periods are common. Occasional summer thunderstorms can bring isolated heavy rains.

Water that does not run off or evaporate, or water that is not taken up by plants, infiltrates into the soil. Soils in the project site and study area drain such water readily but not rapidly (SCS 1984). Draining water eventually reaches bedrock, typically between 20 and 40 inches below the surface. This water is then directed downslope, where it eventually resurfaces at springs, wetlands, and streams, or it may also enter aquifers.

Several of the smaller streams, such as the streams in Sniption and Ferry Canyons, generally dry up during the drier summer months, while the larger streams, such as Hay Creek, flow year-round. These intermittent seasonal streams are generally fed by surface waters, while the perennial streams are generally fed by groundwater from springs.

3.7.4 Environmental Consequences—Proposed Action

3.7.4.1 Definition of Impact Levels

- Impacts related to water resources and wetlands would be considered **high** if the proposed project caused a water body that supports sensitive fish, waterfowl, and animal habitat, or human uses such as drinking water to become altered so as to affect its uses or integrity; or it caused water quality in drainages downstream of the project site to degrade below state or local standards; or it caused permanent changes in wetland hydrology, vegetation, or soils.
- Impacts related to water resources and wetlands would be considered **moderate** if the proposed project did not affect a sensitive water body but caused water quality in downstream drainages to be degraded below state or local standards, which could be partially mitigated; or it caused a wetland to be partially filled or a wetland function to be partially degraded.
- Impacts related to water resources and wetlands would be considered **low** if the proposed project did not affect a sensitive water body but caused water quality in downstream drainages to be slightly degraded (not below state or local standards) and could be fully mitigated; or it caused a short-term disruption of a wetland or a wetland function.

3.7.4.2 Impacts during Construction, Operation and Maintenance, or Decommissioning

No impacts on water resources and wetlands are anticipated from the proposed project for the following reasons. First, no wetlands are located within 500 feet of proposed wind turbine locations or access roads on the project site. Second, the erosion control and soils management techniques to be employed during construction, operation and maintenance, and decommissioning are expected to prevent fine sediments—the main type of potential pollutant from the project—from being introduced

into downstream drainages above existing levels (see Section 3.3 for further discussion of these techniques). Third, it is anticipated that any accidental spills of hazardous or toxic materials used or stored on the project site (fuels, lubricants, solvents) would be in quantities small enough to allow for containment and clean-up before the contaminants reached downstream drainages.

3.7.4.3 Mitigation

No mitigation for water resources would be required.

3.7.4.4 Unavoidable Impacts Remaining after Mitigation

No unavoidable impacts are anticipated.

3.7.5 Environmental Consequences—No Action Alternative

Under the No Action Alternative, the project site would likely remain as farmland used for non-irrigated agriculture. Potential impacts to water resources and wetlands associated with the study area would remain the same as under present conditions.

3.8 Cultural Resources

3.8.1 Regulatory Framework

Regulations established for the management of cultural resources include the Antiquities Act of 1906; the Historic Sites Act of 1935; Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended; the Archaeological Data Preservation Act (ADPA) of 1974; and the Archaeological Resources Protection Act (ARPA) of 1979, as amended. Specific laws also address Native American religious freedom and graves protection as defined by the Native American Graves Protection and Repatriation Act (NAGPRA).

For this project, BPA has entered into a Section 106 (NHPA) consultation process with the Oregon State Historic Preservation Officer, the Advisory Council on Historic Preservation, and the affected Native American tribes. BPA's 1996 Tribal Policy provides a framework for a government-to-government relationship with the 13 federally-recognized Columbia Basin Tribes.

The NHPA amendments specify that properties of traditional religious and cultural importance to a Native American tribe (also known as Traditional Cultural Properties [TCPs]) may be determined to be eligible for inclusion on the National Register of Historic Places. In carrying out its responsibilities under Section 106, BPA is required to consult with any Native American tribe that attaches religious and cultural significance to any properties.

NAGPRA requires consultation with appropriate Native American tribal authorities prior to the excavation of human remains or cultural items (including funerary objects, sacred objects, and cultural patrimony) on federal lands or for projects that receive federal funds. NAGPRA recognizes Native American ownership interests in some human remains and cultural items found on federal lands and makes illegal the sale or purchase of Native American human remains, whether or not they derive from federal or Indian land. Repatriation, on request, to the culturally affiliated tribe is required for human remains.

3.8.2 Study Methodology

The cultural resources evaluation is based on information gained from field surveys of the project site and study area, archival research, and information provided by the proponent (SeaWest) about the project's construction, operation, and decommissioning phases. The study area for cultural resources is shown in Figure 2.1-1.

3.8.2.1 Archival Research

Background research and a records search identified previously documented or known historic properties and previous archaeological surveys conducted in the project site and study area. The definition of a historic property is any district, archaeological site, building, structure, or object included in or eligible for listing in the National Register of Historic Places (U.S.C. 470w[5]). The records search was conducted at the Office of Archaeology and Historic Preservation (OAHP) in Salem, Oregon, by a qualified archaeologist. The University of Washington Library was accessed for background research on the region, and historic maps were consulted to identify regional land use patterns established by the early pioneers. Aerial photographs were also consulted to track the regional land use pattern in more recent times.

Documents indicate that the project site and the majority of the study area have not been previously surveyed for archaeological sites or historic properties. Information available reveals three hunter-fisher-gatherer sites recorded approximately 0.25 mile outside the study area and one historic cistern and associated debris scatter recorded within the PGT-PG&E natural gas pipeline corridor that traverses the study area (see Figure 3.8-1). No TCPs were identified within the project site or study area.

Based on this archival research and the fact the project site and study area have been subject to intensive farming and ranching over the last 100 years, a low probability exists for unknown and intact archaeological sites or historic properties to be found within these areas.

3.8.2.2 Field Survey

Field surveys to assess cultural resources of the project site and study area were conducted on October 15 through 19, 2000 and March 27 through 30, 2001. The initial investigation involved an overview and a sampling of the study area (approximately 15% of the study area) because turbine string locations were not yet decided. A second survey was undertaken once turbine string locations were identified to perform a systematic survey of the specific turbine string locations and associated access roads, the proposed O&M building site, and the electrical power line right-of-way, as well as an inspection of an alternate site for the O&M building in Condon.

Two surveyors, spaced at 10- to 20-meter intervals, recorded notes on all cultural resources encountered. Aerial photographs were consulted, and digital images and color photographs were taken of all significant resources during fieldwork. No shovel probes were excavated during the survey.

3.8.3 Affected Environment

3.8.3.1 Setting and Early History

Schalk's (1980) cultural history sequence provides a framework in which to place the prehistoric cultural resources of the study area. Early human adaptations to the post-glacial Columbia Plateau

from 12000 to 3500 B.P. (before present), covering the periods known as the Early and Middle Archaic, appear to have been more dependent on terrestrial resources than the hunter-fisher-gatherers who followed. Typical artifacts of this period include large Cascade lanceolate points, edge-ground cobbles, and a wide variety of scraping tools. Toward the end of this very long period of human history, plant-processing technology is apparent from pestles and food-grinding stones. Recorded sites suggest relatively small and mobile groups of hunter-fisher-gatherers inhabiting the region.

The next major human habitation period of the region (3500 B.P. to Anno Domini [A.D.] 1730), known as the Late Archaic through Contact Period, was marked by the appearance of structural remains of houses and facilities for storage of food, cemeteries, and a wide variety of new projectile point types. The archaeological record of this period reflects considerable cultural change, with a general trend into larger villages, changes in house form, spatial organization, mortuary practices, and projectile points, all within a subsistence framework.

The next major period (A.D. 1730 to 1850) is distinguished primarily by the introduction of the horse into the region and attendant cultural changes. From an archaeological viewpoint, this period is the least known of the entire archaeological record of the region.

Ethnographically, there appear to have been two or three main users of the study area and general project vicinity. The primary and traditional Native American groups to utilize the study area were the Sahaptin-speaking Yakama, Warm Springs, and Tenino and the Numic-speaking Northern Paiute. The Cayuse, Umatilla, Nez Perce, and Walla Walla groups also are known to have utilized this area. Their hunter-fisher-gatherer economy was based on the harvest of anadromous fish and several species of roots, supplemented by resident fish, plant products, and game (primarily mule deer).

The ethnographic research shows that as many as 100 plant species were regularly used in past times as food resources and many of these plants maintain their importance in modern times. Native plants still utilized by the region's Native American population include Gray's lomatium (*Lomatium grayi*), bare-stem desert parsley or Indian consumption plant (*Lomatium nudicaule*), bitterroot (*Lewisia rediviva*), Canby's lomatium (*Lomatium canbyi*), and camas (*Camassia quamash*). Bare-stemmed lomatium and big seed lomatium plants were identified during a field survey within the study area.

Tribes that have been contacted during initial consultation include the Confederated Tribes of the Umatilla Indian Reservation and Confederated Tribes of the Warm Springs Reservation.

3.8.3.2 Archaeological Research Results

Archaeological research in the study area and vicinity has been limited in scope and area. Most of the investigations have been conducted in conjunction with development projects requiring compliance with federally-mandated cultural resource requirements. Early archaeological fieldwork associated with the installation of a natural gas pipeline between Alberta and California crossed the study area in 1960. Background investigations in conjunction with this pipeline documented all cultural resources encountered (Mallory 1961). Only a handful of archaeological sites were recorded over 600 miles of pipeline right-of-way. The nearest recorded site to the proposed wind project site found during this earlier work, a rock shelter littered with ash, bone, chipped stone, and other organic material, was Site 35SH22, approximately 18 miles south from the project site (Mallory 1961).

A cultural resource survey of the Ghost Camp Reservoir on Rock Creek in 1975 provided evidence of hunter-fisher-gatherer occupation approximately 12 miles east of the project site.

Three previously identified hunter-fisher-gatherer sites are recorded adjacent to the study area: 35GM118, 35GM119, and 35GM120. Based on this data, there is a high probability that

undiscovered hunter-fisher-gatherer deposits might also be present in the study area near these previously recorded sites. These three sites are briefly described below.

Site 35GM118 is in the PGT-PG&E pipeline right-of-way in the bottom of Hay Creek canyon (Gleason et al. 1992). This site is a lithic scatter containing 75 to 100 CCS flakes, a number of basalt flakes, an obsidian flake, and several flaked tools. Based on the projectile points recovered at the site, it was determined that Site 35GM118 dates to the Early Archaic period (10,000 – 7,000 B.P.).

Site 35GM119 is a lithic scatter of flaked stone on the west side of the narrow north-south trending Hay Creek canyon. Site 35GM119 is approximately 800 meters south of 35GM118 in Hay Creek. Test excavations in 1993 uncovered almost 5,000 pieces of flaked stone, 151 tools, 850 grams of animal bones, freshwater shell fragments, and several samples of charcoal (Oetting 1993). Also found during excavation were 77 historic or recent artifacts on or near the ground surface along the northern and southern edges of the site. Excavations at 35GM119 identified a significant hunter-fisher-gatherer deposit that when radiocarbon dated was assigned to the Late Archaic period (2,500 B.P. to historic contact). Based on the substantial amount of cultural material recovered during the excavation and the excellent condition of the site, it was determined Site 35GM119 is eligible for inclusion on the National Register of Historic Places (Oetting 1993).

Site 35GM120 is a low-density lithic scatter located within the PGT-PG&E pipeline right-of-way approximately 5,000 feet north of the Linville town site along Richmond Road (Bailey 1993). Artifacts recorded include a basalt pestle and flaked stone chips. The age of the site is unknown, but based on geomorphic context of the cultural deposit and lithic tool morphology, Site 35GM120 appears to derive from a Middle to Late Archaic occupation (5,000 – 2,500 B.P.).

3.8.3.3 Recent History

The earliest evidence of substantial European historic use in the region dates to the 1840s with the opening of the Oregon Trail, which passed east to west through Gilliam County. European settlement of the region began in earnest in the 1860s and was related to mining, homesteading, and transportation. Condon, known initially as Summit Springs, was established in the early 1880s and became a hub for the local agricultural industry. In 1890, Condon became the county seat of Gilliam County and by 1905 the railroad was completed, connecting the area to the Columbia River.

Recorded historic sites in the study area mainly center on themes of homesteading, ranching, mining, and transportation. These sites date from the late 19th through early 20th centuries. The most common sites are wooden homesteads or cabins or their remains, along with associated features such as wells, outhouses, windmills, trash dumps, and non-native trees. Corrals, fences, flumes, canals, and farm equipment also are present on some sites.

3.8.3.4 Field Survey Results

During the field surveys, three hunter-fisher-gatherer isolated artifacts were identified north of Richmond Road. These isolated artifacts were spaced across several hundred meters along the edge of a ridge and included two CCS flakes and one basalt biface fragment. The two CCS flakes (JS-isolate #2 and JS-isolate #3), both less than 4 centimeters in length, were found 40 meters apart on the western boundary of one of the proposed turbine string locations. A basalt biface fragment (JS-isolate #1) was also identified along the same ridge approximately 50 meters south of the two CCS flakes. The biface is approximately 3 centimeters in length and has fractures on both the proximal and distal ends. A small percentage (1 to 2 percent) of the ventral side has remnants of a red CCS cortex remaining on the biface fragment. These three isolated finds should not be impacted by

the construction of the proposed turbine string, but a high probability exists for unknown hunter-fisher-gatherer deposits along this ridge.

Three historic structures, specifically one homestead with wooden corral, one wooden barn closely associated with a collapsed windmill, and another homestead with barn and four associated outbuildings, were identified within the study area (Figure 3.8-1). The first homestead is located near MP 29.5. An old wooden hand-painted sign, stating "26IU271," was found along ORE206 affixed to a barbed-wire fence, indicating the presence of this structure. This four-room wooden structure has wood shingles and square-head cut nails with overall dimensions of 11 feet by 20 feet. After 1890, machine-made round nails replaced early square-head cut nails. This structure has not been evaluated for listing in the National Register. A historic site inventory form for this structure will be submitted to the Oregon OAHP at Salem.

The wooden barn is located 1,000 feet west of ORE206 near MP 28.4. It is closely associated with a stand of ornamental honey locusts (*Robinia* sp.), which are non-native trees. A collapsed windmill is 25 feet below the barn and more than likely associated with the historic structure. The barn sits atop a cement foundation, is held together with machine-made round nails, and measures 20 feet by 20 feet. The east side of the structure has collapsed. This structure has not been evaluated for listing in the National Register. A historic site inventory form for this historic barn will be submitted to the Oregon OAHP.

The second homestead is located along the proposed transmission line right-of-way adjacent to ORE206 between MP 36 and 37. Located at the base of a ravine approximately 200 feet southwest of the transmission line right-of-way, the homestead, a barn, several outbuildings, and a large trash dump consisting of tin cans, bottles, auto parts, and other debris were found in an accelerated state of decay. The main building was constructed using square-head cut nails and showed evidence of modifications through time. The parcel of land was surrounded by ornamental honey locusts (*Robina* sp.), cottonwood trees (*Populus balsamifera*), and Lombardy poplar (*Populus nigra*). This homestead, accompanying outbuildings, and refuse deposits have not been evaluated for listing in the National Register but they are probably not eligible due to the building's serious state of decay. A historic site inventory form for this homestead will be submitted to the Oregon OAHP.

Two historic refuse sites were identified during the field survey and have not been evaluated for listing in the National Register. Debris from these sites suggests occupation between the 1920s and 1940s. Nine abandoned pieces of historic farm equipment (horse/tractor-drawn disc plows and cultivators) were recorded as isolated artifacts. These historic implements and refuse sites are probably not eligible for listing in the National Register.

A working Aermotor Windmill of unknown age is adjacent to the northern portion of the study area along ORE206 near MP 28. The open-geared steel windmill, originally manufactured by Aermotor from the 1890s through the 1920s, stands approximately 30 feet high and is supported by a four-post steel tower. The width of the sails on this windmill cover 10 feet. Windmills played an important role in the lives of the early settlers of north-central Oregon from the late 19th century to the time when electricity reached remote communities. This functioning windmill has not been evaluated for listing in the National Register; a historic site inventory form will be submitted to the Oregon OAHP.

The remains of two additional windmills of unknown age were identified. The first windmill tower is approximately 250 feet west of ORE206 near MP 28.6 and consists of just the first tier of the four-post tower standing 12 feet high. The top portion of the tower, windmill sails, and vane were not present. The second windmill is approximately 1,500 feet west of ORE206 near MP 28.25, adjacent to the wooden barn mentioned earlier. The four cement post footings were still in place, but the tower was missing. Only a section of the open-geared steel windmill sails was present. It appears to have

been an 8-foot-wide Aermotor windmill on a 15- to 20-foot-high, four-post tower structure. Neither of these structures has been evaluated for listing in the National Register.

3.8.3.5 Consultation

Tribal consultation was initiated by BPA, consistent with the agency's 1996 Tribal Policy. Representatives from BPA and SeaWest met with the Cultural Resources Committees of the Confederated Tribes of Warm Springs Reservation and Confederated Tribes of the Umatilla Reservation during the scoping period for the EIS. The purpose of the meetings was to inform the tribes about the proposed project and to hear any comments or concerns they may have regarding it. Both tribes mentioned the presence of native plant species within the project vicinity that were and still are part of traditional root-gathering forays. Prior to cultural resource field surveys, the tribes declined an invitation to take part in walking over the study area but requested an opportunity to comment on the Draft EIS.

3.8.4 Environmental Consequences—Proposed Action

3.8.4.1 Definition of Impact Levels

Impact levels for cultural resources have not been developed for this EIS. The proposed project would be considered to have an **adverse effect** on cultural resources if it was to alter, directly or indirectly, the characteristic of an archaeological site or a historic property in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.

3.8.4.2 Potential Construction, Operation, and Decommissioning Impacts

Project construction activities would not adversely affect any previously recorded archaeological site or historic property. Preliminary research indicates a low probability for any unknown intact archaeological sites within the project site. Potentially, undiscovered hunter-fisher-gatherer resources may still exist, and construction excavation could encounter unrecorded cultural resources.

If archaeological or historic materials are discovered during construction, further surface-disturbing activities at the site would cease, and appropriate BPA/SeaWest personnel would be notified by their subcontractors to ensure proper handling of the discovery by a qualified archaeologist.

Construction activities would avoid the three hunter-fisher-gatherer isolated artifacts, the three historic structures, two historic refuse sites, and nine abandoned pieces of historic farm equipment previously described. Construction activities are not expected to disrupt plants and habitat (shrub-steppe) that contain plant species and varieties traditionally used by Native Americans. Access to the project site property, which is privately owned, is not currently provided to Native Americans by the present property owners, and project development would not likely change the status of access. Therefore, the project is not expected to change the current availability of ethno-botanical resources to Native American tribes.

No potential adverse effects are anticipated from operation of the proposed project. Potential impacts during decommissioning of the wind project could have the same potential effects as construction.

3.8.4.3 Mitigation

No mitigation measures are required for cultural resources, if the practices and procedures discussed earlier in Section 3.8.4.2 are followed.

3.8.4.4 Unavoidable Impacts Remaining After Mitigation

No unavoidable impacts are anticipated.

3.8.5 Environmental Consequences—No Action Alternative

With the No Action Alternative, the risk of adverse effect on cultural resources in the study area would not change, as long as the land use in the area remained the same. If this project were not built, it is likely another energy resource would be built. Depending on its location, and the ground disturbing activities involved in construction, impacts on cultural resources could be greater.

3.9 Visual Resources

3.9.1 Regulatory Framework

There is no formal regulatory framework for visual resources.

3.9.2 Study Methodology

The approach taken in evaluating potential visual impacts of the proposed project generally follows the visual impact assessment methods developed by the U.S. Forest Service and the Bureau of Land Management. The study area for the visual resources evaluation is generally the viewscapes associated with the study area shown in Figure 2.1-1.

Topography, vegetation size and shape, and developed land uses were reviewed using U.S. Geological Survey quadrangle maps, aerial photographs, surface photographs, and project maps. Field reconnaissance was conducted to determine the general visibility of the proposed wind turbines from sensitive viewpoints (residences, travel routes, and public areas). Visual impacts resulting from construction and operation/maintenance of the project facilities were evaluated by assessing the visual quality of the study area, viewer sensitivity, and the visibility of project facilities (primarily turbines) as seen from sensitive viewpoints.

3.9.2.1 Visual Quality

In this evaluation, visual quality is described as the visual patterns created by the combination of rural landscapes and human-made development features. Visual quality in the study area was assessed using the following descriptions:

- **Urban/developed landscapes.** These are common to urban areas and urban fringes. Human elements in such landscapes are prevalent and certain landscape modifications may exist that do not blend with the natural surroundings.
- **Rural landscapes.** These landscapes exhibit reasonably attractive natural and human-made features/patterns, although they are not visually distinctive or unusual within the region. The landscape provides positive visual experiences such as the presence of natural open space interspersed with existing agricultural areas (farm fields, etc.).
- **Scenic/distinctive landscapes.** These exhibit distinctive and memorable visual features (such as landforms, rock outcrops, streams/rivers, scenic vistas) and patterns (vegetation, open space) that usually occur in an undisturbed rural setting but may also be found in an urban setting.

3.9.2.2 Viewer Sensitivity

Viewer sensitivity, in this evaluation, is described as a combination of viewer type, viewer exposure (number of viewers and view frequency), view orientation, view duration, and viewer awareness/sensitivity to visual changes. Levels of viewer sensitivity in the study area were assessed using the following general criteria:

- **Industrial workers** (mainly located in Condon) are considered to have low visual sensitivity. Compared with other viewer types, the number of viewers with low sensitivity would be generally small and the duration of their view would be short. Activities of these viewers would typically limit their awareness of the visual setting immediately outside the workplace. In addition, landscaping or adjacent buildings may screen their views.
- **Highway and local travelers and agricultural workers** are considered to have moderate visual sensitivity. The number of such viewers and frequency of their views would vary depending on the location of the wind turbine strings. These viewers' sensitivity is considered moderate because although travelers along ORE206 and those engaged in agricultural practices in the project vicinity would frequently view the proposed project facilities, they would be focused on work activities or driving.
- **Residential and passive recreational viewers** are considered to have comparatively high visual sensitivity. The visual setting may in part contribute to these viewers' enjoyment of the experience. Such viewers may potentially see the wind project facilities often and for long periods.

3.9.3 Affected Environment

3.9.3.1 Visual Setting

The study area is located on the Columbia Plateau in north-central Oregon. The population in this rural area is sparse and views extend for miles in some locations. The general terrain in the project vicinity consists of plateaus of gently rolling hills incised by ravines, with no distinctive background. Tenmile Canyon and Ferry Canyon border the northern part of the study area to the east and west, respectively. The study area has relatively few human-made or natural vertical elements, and those that exist consist of transmission lines, a radio tower, windmills, isolated groups of deciduous trees, and a few buildings. The visual characteristics of the study area are described below from north to south, between MP 27 and MP 39 along Highway 206 (ORE206).

ORE206 forms the western boundary, from MP 27 to MP 30. The viewscape on the east side of the highway between MP 27 and MP 30 is an expanse of rolling hills. The relatively flat foreground blends into the background to meet the horizon. Hues of burnt sienna and dark green vary as the vegetation changes from bottlebrush squirreltail grass to gray rabbitbrush. Undulating fields of grasses are punctuated by low-lying, dense native shrub-steppe. Vertical elements in this portion of the study area include a windmill east of the highway at MP 28.5 and a fence that runs parallel to the highway.

Between MP 30 and MP 35 slight depressions in the topography give way to canyons that interrupt gently rolling plateaus of range grass and growing or fallow fields of wheat and barley, depending on the time of year. Vertical elements include a residence surrounded by deciduous trees located at MP 32, west of ORE206 just west of the study area. A radio tower is located at MP 35.

The southern portion of the study area between MP 35 and MP 39 is again crossed by ORE206. The viewscape here has more pronounced smooth-surfaced, rolling hills than the northern portions of the study area just described. The landscape west of the highway is covered with low-lying gray rabbitbrush and bluebunch grass. Vertical elements include 69-kV and 7.2-kV power lines, a radio tower, a residence surrounded by deciduous trees, and a grange hall all within the study area. The southernmost portion of the study area has gently rolling hills incised by ravines.

3.9.3.2 Visual Quality

The visual quality of the study area is rural, with no urban/developed areas. The nearest town is the City of Condon (population 830), located about 5 miles to the southeast. The study area landscape has repeating patterns of wheat and barley cultivation with pockets of CRP land, resulting in a relatively uniform viewscape that does not contain unique or distinctive features. The natural and rural landscape features and patterns in the study area are reasonably attractive and interesting; however, the rural setting is lacking unique or distinctive features that would attract viewers. Landscape alterations such as roads, buildings, structures, and utilities are situated in a random pattern. Therefore, overall visual quality of the study area is considered low to moderate.

3.9.3.3 Viewer Sensitivity

Primary viewer types associated with the proposed project include residents, local or business travelers, occasional recreationists (primarily hunters), agricultural workers, and other types of workers in the area. The most visually sensitive viewers would be people in residences located in or adjacent to the study area (Figure 2.1-1). Visual sensitivity for these residential viewers would range from moderate to high, depending on proximity to and visibility of the turbines.

Recreationists and local or business travelers would mainly be traveling along ORE206 or moving through the area, and their visual sensitivity would be considered low to moderate. Agricultural workers would likely be actively engaged in work-related activities but would be able to view the proposed project site for longer periods. Therefore, these viewers would be seeing the project facilities intermittently for short periods, and their visual sensitivity would be considered moderate, depending on their proximity to the project site.

3.9.4 Environmental Consequences—Proposed Action

Potential visual impacts include temporary visual changes introduced by construction, operation, and maintenance of the wind turbines, and permanent visual changes caused by the presence of the turbines, the substation, and the O&M building. Visual quality and viewer sensitivity are combined to determine visual impacts. Whether the visual impact is considered positive or negative depends on the individual viewer's perceptions.

3.9.4.1 Definition of Impact Levels

- High visual impacts: The visual quality of the viewscape is moderate, viewer sensitivity is high, and views of the project are of long duration or high frequency.
- Moderate visual impacts: The visual quality of the viewscape is moderate, viewer sensitivity is moderate, views are long or short in duration, and viewers are likely engaged in focused activities.
- Low visual impacts: The visual quality of the viewscape is low, viewer sensitivity is low, the duration of views is relatively short, and the number of viewers is relatively small.

3.9.4.2 Impacts during Construction

Construction activities would be of limited duration and would occur mostly between dawn and dusk. Residents in the project vicinity are considered to be the most visually sensitive viewers (Figure 2.1-1). Visual impacts for residents in the project vicinity would be moderate to high for those residences along ORE206 and between Condon and the project site. The residences located in the valleys would have obstructed views of the project site and therefore would experience low to moderate visual impacts. Deciduous trees surrounding residences may partially obstruct the view of the construction activity and further reduce visual impacts. Those residences located west of Condon and those located east of the project site would have relatively unobstructed views and thus would experience relatively high visual impacts. The other residents in the project vicinity would have low impacts because of obstructed views.

Local or business travelers and recreationists traveling along ORE206 would experience low to moderate visual impacts. While the travelers and recreationists would be engaged in focused activities, the construction activity would be visible for some distance and the proximity of the highway to the project site would allow for potential (albeit intermittent) views of long duration.

Agricultural workers would experience moderate visual impacts, depending on their proximity to the project site. While they would be engaged in focused activities, there are a relatively small number of vertical elements in the viewscape, making the construction activity easily visible for some distance. Also, their views would be of relatively long duration (albeit intermittent). Impacts would be higher for those workers in closer proximity to the construction area.

Impacts to other workers in the surrounding area would be low due to the distance to the project site, the short duration of their views of the project site, and the fact that they would likely be focused on work activities.

3.9.4.3 Impacts during Operation and Maintenance

The turbines on the project site would be located on top of relatively flat, sparsely vegetated plateaus and would be visible for some distance. Photosimulations have been prepared depicting typical views of the project site from ORE206 before and after the wind turbines are constructed. Figure 3.9-1 presents a key showing the location of photosimulations. The photosimulations are shown in Figures 3.9-2 through 3.9-6.

Visual impacts would be moderate for residents along ORE206 and between Condon and the project site, depending on their proximity to the turbines. The remaining residences are located in the valleys or are surrounded by deciduous trees and, therefore, the residents would have partially obstructed views and would experience moderate visual impacts.

Visual impacts to local and business travelers and recreationists would be low to moderate. The turbines would be visible for some distance, and while travelers and recreationists would be focused on driving, there is the potential for views of long duration due to the orientation and proximity of ORE206 to the turbine strings.

Agricultural workers in proximity to the project site would experience moderate to high visual impacts. Although these workers would be somewhat focused on their work activities, the turbines would be a prominent part of their viewscape, and their views would likely be intermittent but of long duration. Impacts to other workers in the project vicinity would likely be low due to viewing distance, short duration of views, and their focus on work activities.

If required, aircraft safety measures might include tower striping, daytime white beacon lighting, and nighttime white or red beacons for those towers associated with Condon Airport flight patterns. If

nighttime lights were required for some towers, these would be visible to residents and travelers in the project vicinity.

Relative to other types of utility projects and facilities, or industrial facilities, the wind turbines would present clean, graceful lines that would not overpower the landscape or obstruct views. Because the turbines would be dispersed, and there would be space between individual turbines in the strings, they would be much less of a focal point than many other large structures would be. The towers would be a neutral color that would blend easily with the neutral colors of the landscape.

3.9.4.4 Impacts during Decommissioning

Impacts during decommissioning of the project would be similar to those of construction.

3.9.4.5 Mitigation

Mitigation measures that would help minimize visual impacts include:

- siting all construction staging and storage areas away from locations that would be clearly visible from ORE206 as much as practical;
- providing a clean-looking facility following construction by storing equipment and supplies out of sight, if practical; by promptly removing any damaged or unusable equipment; and by promptly repairing or decommissioning (and removing) turbines that are not functioning or not being used;
- coordinating with Oregon and federal recreational facilities and areas, as well as the Oregon Department of Transportation, to provide signs directing sightseers along ORE206 to public viewing places that could provide safe viewing areas of the project site; and
- keeping turbines and towers clean and touching up paint when needed.

3.9.4.6 Unavoidable Impacts Remaining after Mitigation

The project turbines would be a readily visible part of the viewscape in the project vicinity for residents, agricultural workers, recreationists, and travelers along ORE206.

3.9.5 Environmental Consequences—No Action Alternative

Under the No Action Alternative, the visual quality and sensitivity of viewers of the study area would not be influenced by the proposed project. Energy resources built instead of the proposed project could have visual impacts. The intensity of impact would depend on the location of those energy resources.

3.10 Socioeconomics, Public Services, and Utilities

3.10.1 Regulatory Framework

There is no formal regulatory framework for socioeconomics except for environmental justice. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires that impacts to minority and low-income populations be specifically evaluated for all projects on federal lands, requiring federal permits, or obtaining federal funding. Public services and utilities in the study area and project vicinity are regulated by ordinances and policies set forth by Gilliam County.

3.10.2 Study Methodology

Information sources for this socioeconomic analysis include:

- Oregon Economic and Community Development Department website (http://www.econ.state.or.us);
- Center for Population Research and Census at Portland State University website (http://www.upa.pdx.edu/CPRC); http://quickfacts.census.gov/qfd/states/
- U.S. Census Bureau website (http://www.census.gov);
- State of Oregon Employment Department website (http://www.olmis.org);
- Betsy Pattee, Public Works/Planning Director, Gilliam County Public Works and Planning Department;
- Bonnie Parker, City Administrator, City of Condon Fire Department;
- Chris Fitzsimmons, Office Deputy, Gilliam County Sheriff's Department;
- Bill Gubser, Officer, City of Condon Police Department;
- Archie Ball, Operations Manager, Columbia Basin Electrical Co-op; and
- Jill Layton, Principal, Condon High School.

3.10.3 Affected Environment

The study area for socioeconomic conditions includes the City of Condon and Gilliam County.

3.10.3.1 Population

From 1980 to 1990, Gilliam County's population decreased from 2,057 to 1,717, an estimated 16.5 percent. Condon experienced a similar reduction in population by approximately 19 percent. This population decrease, which continued from the 1970s to 1990, has been attributed to the decommissioning of an Early Warning Radar Station in Condon, which had been a major employer in the area.

Since 1990, the population of Gilliam County, which was 1,717, has increased by 11.5 percent. The population in the county began to increase when the Columbia Ridge Landfill and Recycling Center constructed a landfill, which employs a large segment of the Gilliam County working population (U.S. Census Bureau 1980, 1990; Pattee pers. comm.).

The 1990 Census reports indicate that the age group with the highest representation in Gilliam County (30 percent) was the 20 to 44 age bracket. This age bracket accounted for 25 percent in the City of Condon and 39 percent in the state of Oregon. The median age in the City of Condon in 1990 was 44, higher than the county's median age of 35.

Based on 2000 census data, the population of Gilliam County was 1,915. Approximately 830 people, or 40 percent of the county population, lived in the City of Condon in 1998 (Condon 2000 census data are not yet available).

3.10.3.2 Employment

Nearly 40 percent of the labor force in Gilliam County is employed in farming. Other employment sectors include transportation and public utilities (23 percent); government (18 percent); wholesale and retail trade (11 percent); services (6 percent); finance, insurance and real estate (2 percent); and construction and mining (less than 1 percent).

This indicates a reduction in the farming and government employment sectors from 1990, when these sectors represented 43 percent and 21 percent of the employment at that time, respectively. Employment in transportation and public utilities increased from 1990 to 1998, from 11 percent to 23 percent. Wholesale and retail trade remained constant at 11 to 12 percent from 1990 to 1998.

3.10.3.3 Housing and Lodging

The total number of housing units in Gilliam County in 1990 was 932, of which 356 were located in the City of Condon (2000 census data are not yet available). Approximately three-quarters of the housing units in Gilliam County were occupied, and one-quarter were vacant. About 84 percent were single-unit, detached dwellings. The second most abundant type of housing was mobile homes or trailers, which constituted 11 percent of the total housing units. The next largest group was two-unit structures, which made up 3 percent of the housing units in Gilliam County. Of the vacant housing units, 82 percent were single units.

At present, temporary lodging in Condon includes the Condon Motel, the Condon Trailer and RV Park, and several vacant houses that are available for rent. The Condon Motel has 18 rooms. Approximately 26 houses that were constructed for the Early Warning Radar Station are vacant and available to rent (Pattee pers. comm.).

3.10.3.4 Fire and Medical Service

The City of Condon Fire Department has a volunteer chief and 20 volunteer firefighters. There are two stations in the City of Condon. One station, located in City Hall, has two trucks and is set up to fight structural fires. A second station in Condon, part of the South Gilliam County Rural Fire Protection District, is set up to fight field and brush fires and is equipped with six vehicles. Fire service for the project would be provided by the South Gilliam County Rural Fire Protection District.

No documentation was available on the number of calls for fire service; however, according to City Administrator Bonnie Parker, the city fire department usually responds to approximately two calls per month.

Gilliam County Medical Center in Condon is staffed by two physician assistants with supervision by a medical doctor from Hermiston. The nearest hospital is located in The Dalles, 70 miles northwest of Condon. The City of Condon is served by a volunteer Emergency Medical Technician crew with two fully equipped ambulances, and by Life Flight helicopters, out of Bend (120 miles south), for major emergencies.

3.10.3.5 Police Service

Police service for the project would be provided by the Gilliam County Sheriff's Office, located in downtown Condon. The Sheriff's Office has four vehicles and five full-time employees: a Sheriff, a Chief Deputy, two Deputies, and an Office Deputy. The 911 Center that serves Gilliam County is located in Morrow County.

The Sheriff's Office responds to all police, emergency, and fire calls. The Sheriff's Office responded in 1999 to 313 emergency 911 calls and 393 non-emergency calls in Gilliam County (including Condon). Within the City of Condon in 1999, the Sheriff's Office responded to 76 police (or 911) calls; 45 ambulance calls; 20 fire calls; and 8 other calls.

A game warden and an Oregon State Police trooper work out of the Sheriff's Office. The trooper covers south Gilliam County and north Wheeler County. A second State Police outpost located in Arlington has four troopers and one game warden.

In addition, the City of Condon Police Department employs two full-time officers and one reserve officer and has two vehicles. According to Officer Bill Gubser, the Condon Police Department receives approximately 100 to 150 calls for service per year.

3.10.3.6 Electrical Services

A substation southwest of the project site reduces the 69-kV power from the BPA Condon-DeMoss transmission line to 7.2 kV for distribution (Figure 2.1-1). The 69-kV transmission line runs generally parallel to ORE206 between the DeMoss and Condon substations and provides electric power to the surrounding area (Ball pers. comm.). Columbia Basin Electric Co-op, a full-requirements customer of BPA, serves the community.

3.10.3.7 Water and Sanitary Sewer Systems

There are no municipal or cooperative water or sewer systems serving the study area. Residences and other buildings have wells and individual septic tanks. Also, there are no irrigation systems in the study area; all farming is dryland.

3.10.3.8 Solid Waste Disposal

Solid waste collection in the project vicinity is provided by Columbia Ridge Landfill and Recycling Center, and Sunrise Sanitation, which has a local hauling contract with the City of Condon. Columbia Ridge Landfill and Recycling Center is located in Arlington and is operated by Waste Management, Inc.

3.10.3.9 Environmental Justice

Based on the 1990 census, the population distribution among races in Gilliam County and Oregon is as shown in Table 3.10-1.

Table 3.10-1. Race in Gilliam County and Oregon, 2000

Race	Gilliam County		Oregon	
African American	3	(0.16%)	55,662	(1.62%)
American Indian and Alaska Native	16	(0.84%)	45,211	(1.32%)
Asian	3	(0.16%)	101,350	(2.96%)
Native Hawaiian and Other Pacific Islander	0	(0.00%)	7,976	(0.23%)
White	1,853	(96.8%)	2,961,623	(86.56%)
Hispanic or Latino (of Any Race)	35	(1.82%)	275,314	(8.05%)
Other race	22	(1.15%)	144,832	(4.23%)
Total	1,915		3,421,399	
Source: www.census.gov accessed 5/6/01				

The U.S. Census Bureau follows the Office of Management and Budget's Statistical Policy Directive 14 to determine poverty status based on income level. Poverty status can be used as a measure of low income for environmental justice analyses. The number of people below the poverty level was 12 percent in both Gilliam County and the State of Oregon in 1989 (2000 census data not yet available) (www.census.gov accessed 1/3/01).

3.10.4 Environmental Consequences—Proposed Action

3.10.4.1 Definition of Impact Levels

For this evaluation, socioeconomic impacts associated with the proposed project were assessed as either **beneficial**, **adverse**, or **no impact**.

- A **beneficial** socioeconomic impact would provide employment, increase tax revenues, increase property values, increase revenue from rents and home sales, or create other enhancing effects on the social and economic vitality of affected communities.
- An **adverse** socioeconomic impact would reduce the tax base, reduce employment or property values, or create other similar deleterious effects on the social and economic vitality of the City of Condon and/or Gilliam County.

3.10.4.2 Impacts of Construction

During construction, no housing impacts are expected because sufficient housing is available in the City of Condon, and a minor temporary increase in population would occur. There is the potential for a beneficial impact on unemployment if some workers are hired locally. A minor beneficial impact on the local economy would occur from the purchase of goods and services and through rental of housing units. Minor increases in the need for emergency fire, medical, and police services may occur. No impact to schools or utilities are expected.

Approximately 60 to 70 workers would be hired over each 4- to 5-month construction period of phases 1 and 2 of the proposed project, with such employment not exceeding 30 workers at any one time. Phase 1 of construction is proposed to begin and be completed in late 2001, and phase 2 could be built as early as summer 2002. Phases 1 and 2 would not overlap. Assuming at least 33 percent local hiring (Gilmore et al. 1981), 10 of the 30 workers would be hired locally and 20 would in-migrate. If the in-migrants were to be temporarily housed in Gilliam County, this would represent a 1 percent increase of the 2,100 individuals estimated to be living in the county (including Condon). If workers were housed in Condon, which is likely given the proximity of the city to the project site and the availability of housing, a 2.4 percent temporary increase in population would occur in the City during each phase. Assuming 20 workers would in-migrate, the capacity of housing in Gilliam County and Condon would be sufficient.

Gilliam County's unemployment rate was estimated to be 4.9 percent in 1998 (according to State of Oregon Employment Division data). Neighboring Sherman and Wheeler County unemployment rates were estimated to be 5.6 percent and 8.2 percent, respectively. This means that approximately 170 people are unemployed in the three counties. This may be sufficient to provide the workforce needed for the project, although some of the available workforce would likely not have the required training and skills to perform some of the construction tasks. Benefits to the local economy (City of Condon and Gilliam County) and the regional economy (Sherman, Wheeler, Umatilla, and Wasco Counties) include the potential for employment and the purchase of goods and services.

Equipment (wind turbines and substation) would likely be purchased from outside the local and regional economic areas. However, the majority of goods and services would be purchased locally and regionally (such as contractors; heavy equipment such as cranes and forklifts [rented]; vehicles [purchased]; lodging; fencing materials; uniforms; cleaning supplies; fuel; office supplies; tools; cement; and technicians and office staff). The estimated local expenditures for construction are estimated to be in the range of $445,000 to $570,000. The estimated regional expenditures for construction are estimated to be in the range of $3.7 million to $4.5 million.

During construction, the increased activity at the project site could increase the potential for fires and the need for medical and police services at the project site. Should fire service be required, the City of Condon Fire Department and the South Gilliam County Rural Fire Department, located in Condon, have sufficient facilities to handle such emergencies. The Gilliam County Medical Center in Condon would be available for minor injuries. The two ambulances in Condon could provide Emergency Medical Technician crews and transportation to the nearest hospital located in The Dalles, Oregon, 70 miles northwest of Condon. Life Flight helicopter service out of Bend, Oregon, 120 miles south of Condon, could transport patients to Portland, The Dalles, or Bend for major medical emergencies. The existing Condon and Gilliam County police departments would provide sufficient services, if required. An emergency response plan for the project would be prepared and kept onsite, and construction and operations personnel would be trained in the emergency procedures.

It is unlikely that families would temporarily locate in Condon or the surrounding area during the construction period for each phase. However, excess capacities in the Condon Elementary and High Schools would accommodate additional students if needed.

No construction impacts to existing electrical systems, water and sanitary sewer systems, or solid waste disposal are anticipated because the proponent would construct its own facilities or contract for construction. No new housing would be required.

The project would be located entirely on private property and not in the vicinity of low-income or minority populations. It would not displace or negatively affect minority or low-income people, who could experience a beneficial impact from the project if they became part of the construction workforce.

3.10.4.3 Impacts of Operation and Maintenance

During operation of the project, no impacts are expected to housing, and only minor adverse impacts could occur to emergency services and schools. Beneficial impacts on the local economy would result from increased tax revenues and the purchase of goods and services. In addition, acquisition of the output of the project by BPA would help reduce BPA's energy resource deficit. The electricity produced by the proposed project is relatively inexpensive and would help BPA reduce power purchases in today's expensive electricity market. Thus, local utility prices are not expected to be affected as a result of the project because the energy produced would be sold to BPA and added to their supplies of energy.

During operation, two to six full-time staff (assuming both phases are built) would be employed by the project. There would be no impacts to housing because there is an adequate housing supply in Gilliam County and the City of Condon. The project would have a beneficial impact on unemployment if the full-time staff were hired locally.

Up to six families (assuming both phases are built) could permanently locate in Condon or the surrounding area, if the required staff were not hired locally. Excess capacities in the elementary and high schools would accommodate potential students.

Because of the project's presence, project operation could increase the chance of fire and other emergencies at the project site, compared to conditions if the project is not constructed. However, turbines are not at risk from low-burning field fires, nor are turbines likely to start fires.

The project could have a beneficial impact on the local and regional economies through purchase of goods and services. The annual local expenditures in the City of Condon and Gilliam County during operation and maintenance are estimated to be between $170,000 and $240,000. Annual regional expenditures in Sherman, Wheeler, Umatilla, and Wasco Counties are estimated to be in the range of $24,000 to $60,000.

The capital investment would also result in increased property tax revenues. Economic benefits to Gilliam County include an increased tax base (property tax payments of between $540,000 and $580,000 annually). Additional income taxes for the state of Oregon would also be generated. The amount of property taxes paid is based on the assessed value of the property. SeaWest would pay any increase in property taxes incurred by the property owner.

The landowners leasing land to SeaWest would also receive economic benefits in the form of annual land lease payments. These are estimated at between $110,000 and $135,000 for years 1 – 10 of the 20-year project life; and $175,000 to $210,000 for years 11 – 20.

SeaWest is pursuing property tax relief under the State of Oregon's Enterprise Zone program. The annual property taxes to Gilliam County would be reduced (by an undetermined amount) if SeaWest were provided with property tax relief.

The estimated potential annual benefits to the local and regional economies are shown in Table 3.10-2.

Additional indirect local and regional economic benefits would potentially result from the multiplier effect of economic activity generated by the project, such as the creation and sale of new goods and services, or employment opportunities.

Table 3.10-2. Potential Annual Economic Benefits to Local and Regional Economies Resulting from the Proposed Project

Item	Economic Value	
	Local Economies (City of Condon, Gilliam County)	**Regional Economies (Sherman, Wheeler, Umatilla, Wasco Counties)**
Construction goods and services	$445,000 - $570,000	$3.7 to $4.5 million
Land lease payments	$110,000 - $210,000	Not applicable
O&M expenditures	$170,000 - $240,000	$24,000 - $60,000
Property tax	$540,000 - $580,000	Not applicable
Agricultural crop loss	$1,000 - $2,000	Not applicable
Source: SeaWest, 2001		

Potable and unpotable water would be supplied to the project site through use of portable equipment or under contract. A contract with a local hauler would be arranged to handle collection and disposal of any solid waste generated by the project.

Minority and low-income people would not be adversely affected by project operations due to the small size of the operational workforce. These individuals could experience a beneficial impact from the project if they became part of the operational workforce.

3.10.4.4 Impacts of Decommissioning

Anticipated impacts during decommissioning (dismantling) of the project facilities would be similar to construction, including the beneficial impact of hiring some local workers to dismantle the project. The up to six full-time jobs created as part of the project would be eliminated. This loss of employment would likely have a slight adverse impact on employment and the local economy.

Decommissioning of the project would not displace or negatively affect minority or low-income people because it would take place entirely on private property and not within close proximity to minority or low-income populations. These people could experience a beneficial impact from the project if they became part of the decommissioning workforce.

3.10.4.5 Mitigation

No mitigation measures are required.

3.10.4.6 Unavoidable Impacts Remaining after Mitigation

No unavoidable impacts are anticipated.

3.10.5 Environmental Consequences—No Action Alternative

Under the No Action Alternative, the socioeconomic conditions in the project vicinity and surrounding area would continue without influence from the proposed project. The county would not benefit from the tax revenues and employment opportunities brought by the project.

3.11 Transportation

The study area for the transportation analysis includes local roads in the general project vicinity and the road system serving Gilliam County between Condon and Interstate 84. The analysis focuses on roads that would be used by project personnel during construction of each phase of the project and following construction for operation and maintenance (Figure 2.1-1).

3.11.1 Regulatory Framework

Gilliam County Public Works Department's Roadmaster develops a Roadmaster Policy Workplan, which annually outlines scheduled maintenance and improvements to Gilliam County roads.

Gilliam County Public Works has no weight restrictions on county roads, except during inclement weather when a 10-ton limit is imposed. Large loads carried on the county roads are primarily hay and cattle. State highways in the vicinity of the project are subject to width and length restrictions, as well as weight limitations. Annual permits are needed for large load transport on Highway 19 (ORE19) (12-foot width and 75-foot length) and ORE206 (12-foot width and 65-foot length). Loads that exceed the permitted lengths require single-trip permits from the Oregon Department of Transportation (ODOT).

3.11.2 Study Methodology

Information used in this section includes traffic data obtained from the ODOT website (http://www.odot.state.or.us/ tdb/traffic_monitoring/ tvtable.asp). Additional information sources include a Gilliam County Roads Map and interviews with Gilliam County Public Works Department and ODOT's Motor Carrier Transportation Division.

Information regarding length and weight restrictions, existing road conditions, and planned improvements/maintenance in the project vicinity was obtained from interviews with Betsy Pattee, Gilliam County Public Works; Dewey Kennedy, Roadmaster, Gilliam County Public Works; Rick Rodgers, Program Coordinator, ODOT Motor Carrier Transportation Division, Over-Dimensional Permit Unit; and Dan Kaplan, Mileage Control Specialist, ODOT Road Inventory and Classification Services. Site visits were conducted in October 2000 to examine road conditions and to verify existing access roads in the project vicinity.

3.11.3 Affected Environment

Access to the study area is provided by highways described below and depicted in Figure 2.1-1.

Highway 19 (ORE19) is a major north-south arterial located approximately 5 miles from the project site, where it intersects with ORE206 at the City of Condon. It extends from Interstate 84 along the Columbia River south to Wheeler County, Oregon. ORE19 is classified as a two-lane Principal Arterial. Near Condon, pavement conditions are good and shoulders are provided. The lane width of ORE19 in the vicinity of the project is 12 feet with 4-foot shoulders on either side of the highway. The speed limit outside Condon is 55 miles per hour.

Highway 206 (ORE206) extends from Interstate 84 along the Columbia River southeast through Condon and into Morrow County, east of Gilliam County. ORE206 extends along the north-south axis of the study area from MP 27 to MP 39 and is classified as a two-lane Principal Arterial (Figure 2.1-1). Near Condon, pavement conditions are good and shoulders are provided. The lane width of ORE206 is 12 feet. The speed limit outside Condon is 55 miles per hour.

Approximately 100 miles of Gilliam County roads are paved, while over 300 miles are gravel roads. The county roads currently have no planned improvements. General maintenance on gravel roads includes grading twice a year, in the spring and fall. The paved roads are patched as needed. Every other year the paved roads are oiled and rock is applied. This activity was last completed in 2000 and is planned for 2002 (Pattee pers. comm.).

Three county roads provide access to the project site. These include Richmond Lane and Ferry Canyon Road, located east of ORE206, and Old Cottonwood Road, located north of and parallel to ORE206. Richmond Lane and Ferry Canyon Road are paved, two-lane roads with no shoulders and are in fair to good condition. Old Cottonwood Road is graveled. Several private gravel roads off of ORE206 provide access to the project site but are not open to the general public.

3.11.3.1 Traffic Volumes

Traffic data along ORE19 and ORE206 (both are truck routes) were collected by ODOT in 1999. The average daily two-way traffic (ADT) volume on ORE206 approximately 0.4 mile east of Condon was 238 vehicles in 1999. Traffic volumes were highest in July and October, with ADT of 274 vehicles in July and 286 vehicles in October. The lowest ADT volumes were recorded in January with a count of 191 vehicles. Approximately 32 percent of the vehicles in 1999 on ORE206 near

Condon were passenger vehicles; 46 percent were other two-axle, four-tire vehicles; and 12 percent were single unit two-axle, six-tire vehicles.

The 1999 ADT volume on ORE19 (approximately 4 miles south of Arlington) was 855 vehicles. Traffic volumes were highest in July and August, with ADT volumes of 940 and 886 vehicles, respectively. The lowest ADT volumes were recorded in February, with a count of 794 vehicles. Approximately 33 percent of the vehicles in 1999 on ORE19 near Arlington were passenger vehicles; 24 percent were other two-axle four-tire vehicles; and 28 percent were semi-trailer trucks with six-plus axles.

Traffic volumes are not available for Gilliam County roads. However, traffic volume is relatively low, and these roads are generally used to access local residences (Pattee pers. comm.).

3.11.4 Environmental Consequences—Proposed Action

3.11.4.1 Definition of Impact Levels

- Transportation impacts associated with the project would be considered **high** if damage to state highways or county roads occurred, or if normal use of the state and county roads in the project vicinity were halted or impaired for considerable periods each day during project construction or operation.
- Transportation impacts would be considered **moderate** if some minor damage to state highways or county roads occurred, or if normal use of the state and county roads in the project vicinity were halted or impaired for relatively short periods during project construction or operation.
- Transportation impacts would be considered **low** if no damage to state highways or county roads occurred, or if normal use of the state and county roads in the project vicinity were temporarily halted or impaired for very brief periods during project construction or operation.

3.11.4.2 Impacts during Construction

Transportation impacts associated with the 4- to 5-month project construction period for each of phases 1 and 2 are anticipated to be low. During project construction, heavy and light vehicles would access the site. Equipment and components would be transported to the project site via trucks, along ORE206 and/or ORE19, by a contract company or the manufacturer.

During the construction period for each phase, there would be approximately 25 to 50 daily round trips (50 to 100 one-way trips) of construction, delivery, and personnel vehicles. Over the entire construction period for each phase, this estimate includes the 112 to 231 round trips (224 to 462 one-way trips) of flatbed trucks delivering the tower sections, nacelles, and blades, as well as all dump trucks, concrete trucks, cranes, other construction vehicles, trade vehicles, and personnel vehicles. Therefore, based on 1999 ADT volumes, during phases 1 and 2, ADT would increase between 21 and 42 percent on ORE206 and between 6 and 12 percent on ORE19.

No convoys would be used to bring in construction equipment or components. At times, a few vehicles delivering components or equipment may queue on ORE206, waiting to enter the project site, in a single day and within a relatively short amount of time. This could cause minor and temporary delays in local traffic.

The contract companies and manufacturers would consult with ODOT and Gilliam County Public Works Department to ensure the most appropriate routes for site access. Necessary permits (primarily single-trip permits) would be secured as required.

Direct site access would likely be from ORE206 onto the project access roads on private farmland. Some of the project access roads are existing farm roads that would be resurfaced and/or relocated for project use, while the balance of the project access roads would be new. No improvements to state or county roads are anticipated to be required.

3.11.4.3 Impacts during Operation and Maintenance

Transportation impacts during operation and maintenance are anticipated to be low. Assuming the presence of up to six personnel, there may be 2 to 6 daily round trips (4 to 12 one-way trips daily) to and from the project site. Ordinary operation and maintenance traffic would consist of personal vehicles and project pickup trucks. On infrequent occasions, larger equipment, such as flatbed trucks or a crane, may be required to replace or repair parts. Based on 1999 volumes, ADT would increase a maximum of 3 percent on ORE206 and a maximum of 1 percent on ORE19 during operation and maintenance. An indirect effect could result from increased traffic on ORE206 associated with sightseers curious about the wind project, but this cannot be predicted.

On occasion, parts of turbines or other components may need to be transported onto or offsite to effect repairs, but the frequency of such events would be low, and impacts to transportation in the project vicinity are not expected.

3.11.4.4 Impacts during Decommissioning

Decommissioning would involve some of the same types of impacts indicated for construction, and are anticipated to be low.

3.11.4.5 Mitigation

Mitigation measures that would help minimize transportation-related impacts include:

- coordinating routing of construction traffic with the Gilliam County Public Works Department;
- employing traffic control flaggers and signs warning of construction activity and merging traffic, as required; and
- repairing any damage to state and/or county roads caused by the project.

3.11.4.6 Unavoidable Impacts Remaining after Mitigation

Potential unavoidable transportation impacts could consist of minor delays and interruptions in local traffic during construction and decommissioning.

3.11.5 Environmental Consequences—No Action Alternative

With the No Action Alternative, transportation in the project vicinity would continue without influence of the proposed project. Roads that would have been improved for the project would be left unimproved.

3.12 Air Quality

This section describes air quality impacts that could result from construction and operation of the proposed project. Wind power projects do not involve the combustion of fuels to generate electricity, so there are no air quality impacts from the generation of power. Any air quality impacts would be related to emissions from vehicles and from dust associated with construction and operation/maintenance activities.

3.12.1 Regulatory Framework

In conformance with the Clean Air Act, the State of Oregon has adopted the federal National Ambient Air Quality Standards (NAAQS) shown in Table 3.12-1.

Table 3.12-1. National Primary Ambient Air Quality Standards

Pollutant	Standard
Total Suspended Particulate Matter	
Annual Geometric Mean	No standard
24-hour Average	No standard
Inhalable Particulate Matter (PM10)*	
Annual Arithmetic Mean	50 $\mu g/m^3$
24-hour Average	150 $\mu g/m^3$
Sulfur Dioxide	
Annual Average	0.03 ppm
24-hour Average	0.14 ppm
3-hour Average	No standard
1-hour Average	No standard
Carbon Monoxide	
8-hour Average	9 ppm
1-hour Average	35 ppm
Ozone	
1-hour Average	0.12 ppm
8-hour Average	0.08 ppm
Nitrogen Dioxide	
Annual Average	0.05 ppm
Lead	
Quarterly Average	1.5 $\mu g/m^3$
$\mu g/m^3$ = micrograms per cubic meter; ppm = parts per million * PM10 refers to particles that are smaller than 10 microns in diameter, and thus small enough to reach the lungs if inhaled.	

3.12.2 Study Methodology

Air quality impacts associated with phases 1 and 2 of the proposed project were evaluated using fugitive dust emission factors contained in the Environmental Protection Agency's Compilation of Air Pollution Emission Factors (AP-42). The study area is shown in Figure 2.1-1 and includes the surrounding airshed.

3.12.3 Affected Environment

The air quality attainment status of Gilliam County is not currently classified and air quality in the county is not monitored. Because of the sparse population and rural nature of the area, Gilliam County is likely to be in attainment for all criteria pollutants. Existing sources of air pollution are likely to be minimal.

The climate in the area is very dry (16 inches of precipitation annually). Wind-blown dust is prevalent in non-irrigated agricultural areas such as the project site and study area because soils are often composed of fine-grain silt loams. Dust is generated in such environments by agricultural activities, vehicles traveling on dirt roads, construction, and other activities that disturb soil.

3.12.4 Environmental Consequences—Proposed Action

3.12.4.1 Definition of Impact Levels

- Impacts related to air quality would be considered **high** if the proposed project created noticeable or measurable air emissions that exceeded NAAQS.
- Impacts related to air quality would be considered **moderate** if the proposed project created noticeable or measurable air emissions that did not exceed NAAQS, and which could be partially mitigated with standard control practices.
- Impacts related to air quality would be considered **low** if the proposed project created small amounts of noticeable or measurable air emissions that did not exceed NAAQS, which could be substantially mitigated with standard control practices.

3.12.4.2 Impacts during Construction

Air quality impacts associated with construction of phases 1 and 2 of the proposed project would be low. The primary type of air pollution during construction would be combustion pollutants from equipment exhaust and fugitive dust particles from disturbed soils becoming airborne. Construction activities that could create dust include road improvements and construction, work area clearing, and underground utility cable trenching. Project construction activities would temporarily disturb approximately 58 acres for phase 1 and 46 acres for phase 2.

The amount of pollutants emitted from construction vehicles would be relatively small and similar to current conditions with the operation of agricultural equipment in the project site and vicinity. Such short-term emissions from construction sites are exempt from air quality permitting requirements. Standard practices to control dust would be employed to substantially reduce emissions, including:

- watering exposed soil surfaces each day during dry weather, especially when blowing dust is visible;
- covering construction materials that could be a source of dust when stored;

- limiting vehicle speeds along non-graveled roads to 25 miles per hour;
- covering truck beds when transporting dirt/soil (if applicable); and
- shutting down idling construction equipment, where feasible.

3.12.4.3 Impacts during Operation and Maintenance

Operation and maintenance impacts to air quality would be negligible for each phase of the project. Project facilities would have a permanent footprint of approximately 21 acres for phase 1 and 17 acres additional for phase 2. This post-construction footprint is substantially less than the area that would be temporarily disturbed during construction (58 acres for phase 1 and 46 acres for phase 2). Operation and maintenance vehicles would mainly use access roads with paved or graveled surfaces, and the quantities of potential emissions would be very small, temporary, and localized.

3.12.4.4 Impacts during Decommissioning

Potential project-related air quality impacts during decommissioning of the facilities would be similar to those during construction and would be low. The standard control practices employed to minimize potential impacts from construction activities would also be applied to decommissioning activities, as necessary.

3.12.4.5 Mitigation

No mitigation measures are required if the standard control practices listed above are employed.

3.12.4.6 Unavoidable Impacts Remaining after Mitigation

Unavoidable impacts from the project include very low levels of combustion pollutants and dust from vehicles during project construction, operation and maintenance, and decommissioning.

3.12.5 Environmental Consequences—No Action Alternative

Under the No Action Alternative, the study area would likely remain as farmland used for non-irrigated agriculture. Potential impacts to air quality associated with the project would not occur. The most likely alternative to wind generation would be electricity generated from the combustion of fossil fuels. Fuel combustion from electric utilities generated 417,000 tons of carbon monoxide and 6.1 million tons of nitrogen oxides in 1998. Total fossil fuel combustion produced 1,500 million metric tons carbon-equivalent of carbon dioxide in 1997 (EPA 2000). Nitrogen oxides contribute to ozone generation in the lower atmosphere, and carbon dioxide is considered a greenhouse gas that contributes to global warming.

The most likely resources to be built in the region would be combined cycle combustion turbines (CTs). BPA's Resource Programs Final EIS (RP EIS) included an analysis of environmental effects of CTs on a per average megawatt (aMW) per year basis. Emission rates for CTs were estimated at 5.81 tons of nitrogen oxides and 3,904.95 tons of carbon dioxide. Although improvements in air emission control technology and the increasing stringency of air quality permit requirements by state agencies have led to lower emission rates, CTs still remain a significant source of air emissions. In addition to the emissions from the generation itself, there are also emissions of sulfur oxides, nitrogen oxides, and particulates associated with the extraction of natural gas and pipeline transportation.

3.13 Noise

3.13.1 Regulatory Framework

3.13.1.1 Noise Standards

Noise standards applicable to this project are established under the Oregon Revised Statutes (ORS) Chapter 467 (Noise Control), and the Oregon Administrative Rules (OAR) Division 35 (Noise Control Regulations). Responsibility for enforcement of applicable regulations is assigned to the local sheriff's department (in this case, Gilliam County). The Oregon Department of Environmental Quality provides assistance and guidance as required.

The allowable hourly noise levels under Oregon state law are shown in Table 3.13-1.

Table 3.13-1. Oregon State Allowable Hourly Noise Levels (dBA)

Sound Measurement Level	7 a.m. to 10 p.m.	10 p.m. to 7 a.m.
L50	55	50
L10	60	55
L1	75	60

3.13.1.2 Noise Fundamentals

The following is a brief discussion of environmental noise fundamentals that may facilitate understanding noise impact evaluations.

Sound travels through the air as waves of diminutive air pressure fluctuations caused by vibration. Because energy contained in a sound wave is spread over an increasing area as it travels away from the source, loudness decreases with distance.

Sound is measured in decibels (dB). Because the human ear does not respond equally to all sound frequencies, an "A-weighted" scale (the dBA scale) is generally used to assess the effects of noise on people. A-weighted sound level measurements reduce the measured sound pressure level for low-frequency sounds and slightly increase the measured pressure level for some high-frequency sounds. All sound levels in this section are reported in dBA.

A 10 dBA increase in a noise source is actually a doubling of loudness. People generally cannot detect a change in sound level of less than 3 dBA. Table 3.13-2 shows some common noise sources and the sound levels they produce.

The dBA scale is logarithmic. Therefore, individual dBA ratings for different sources cannot be added directly to calculate the sound level for combined sources. For example, two sources, each producing 50 dBA will, when added logarithmically, produce a combined noise level of 53 dBA.

The sound level in a given area usually fluctuates over time. In order to provide a standard way to describe fluctuating sound levels, one convention is to use "equivalent sound level" (known as the "L_{eq}"). The L_{eq} is generally accepted as the "average" sound level.

Table 3.13-2. Examples of "A-Weighted" Sound Levels

Sound Source	dBA*
Jet takeoff (200 feet), auto horn (3 feet)	120
Jet takeoff (2,000 feet)	110
Shout (0.5 foot)	100
Heavy truck (50 feet), pneumatic drill (50 feet)	90
Passenger train (100 feet), helicopter (in-flight, 500 feet), freight train (50 feet)	80
Freeway traffic (50 feet)	70
Air conditioning unit (20 feet), light auto traffic (50 feet)	60
Normal speech (15 feet)	50
Living room, bedroom, library (normal activity)	40
Soft whisper (15 feet)	30

* Typical A-weighted sound levels taken with a sound-level meter and expressed as decibels on the scale. The "A" scale approximates the frequency response of the human ear.

Source: U.S. Council on Environmental Quality 1970.

Another standard way to evaluate noise impacts that is often combined with L_{eq} is establishing what percentage of the time the sound in a given area falls above or below a certain level. These levels are designated L1, L10, L50, and L90. L1 represents the ambient sound level that is exceeded 1 percent of the time for the period under consideration. In other words, 99 percent of the time sound levels in the area under consideration fall below the L1 value. Similarly, L10 is the sound level that is exceeded 10 percent of the time, L50 is exceeded 50 percent of the time, and L90 is exceeded 90 percent of the time.

3.13.2 Study Methodology

This noise impact analysis was based on sound level measurements taken in the field, vendor-supplied noise data associated with the 600-kW wind turbine model proposed for the project, and computer modeling of the turbine strings using the L_{eq} descriptor. The impacts associated with the 41-turbine configuration phase 1, and the 83-turbine configuration of phase 1 plus phase 2, were evaluated for the 12 background sound measurement locations shown in Figure 3.13-1.

3.13.3 Affected Environment

The existing noise environment in the project site and study area is relatively quiet, with occasional noise resulting from scattered farm machinery, vehicles on local roads, birds, and wind. There are no obvious noise-producing sources in the vicinity. The primary noise source is occasional vehicle traffic on ORE206. Other noise sources include the occasional operation of farm equipment and vehicles traveling on side roads connected to ORE206.

Because the project site, study area and general vicinity are rural and sparsely populated, background noise levels at locations distant from traveled roadways are relatively low. An ambient noise monitoring survey was conducted in the study area on October 16 and 17, 2000. Short-term sound level measurements in durations of 5 to 6 minutes were taken at 12 locations in the study area using a Larson-Davis model 700 Type 2 sound level meter fitted with a windscreen. Windy conditions existed throughout the measurement period. Measurement locations are depicted in Figure 3.13-1, while Table 3.13-3 summarizes the results of the sound level measurements.

Table 3.13-3. Summary of Background Sound Level Measurements

Measurement Location	dBA			
	L_{eq}	L_{10}	L_{50}	L_{90}
1	60	63	58	52
2	58	59	52	44
3	59	62	57	52
4	52	54	41	39
5	51	54	43	39
6	55	59	49	42
7	45	48	43	41
8	58	62	55	49
9	60	65	56	49
10	40	43	39	38
11	41	42	39	38
12	42	40	38	38

3.13.4 Environmental Consequences—Proposed Action

This section evaluates potential noise impacts that could result from construction and operation of both phases of the proposed project. This assessment is based on background sound levels measured in the project vicinity, noise data on the proposed 600-kW wind turbine supplied by the vendor, and site-specific computer noise modeling.

3.13.4.1 Definition of Impact Levels

- Noise impacts from the proposed project would be considered **high** if existing residences or other facilities with human habitation would be exposed to project-related noise exceeding noise standards under ORS Chapter 467 (Noise Control) and OAR Division 35 (Noise Control Regulations), and the predicted noise level would be more than 3 dB greater than the background sound level.
- Noise impacts from the proposed project would be considered **moderate** if existing residences or other facilities with human habitation would be exposed to project-related noise that is less than the Oregon noise standard described above but more than 3 dB greater than the background sound level.
- Noise impacts from the proposed project would be considered **low** if existing residences or other facilities with human habitation would be exposed to project-related noise that is both less than the Oregon noise standard described above and no more than 3 dB above the background sound level. In this instance noise may still be audible.

3.13.4.2 Impacts during Construction

Occupied residences in the vicinity of the project site could be exposed to moderate to high levels of construction noise associated with grading and earthmoving activities, hauling of materials, building of structures, and construction of the turbines. Table 3.13-4 summarizes noise levels produced by construction equipment that would likely be used at the project site.

Table 3.13-4. Construction Equipment Noise

Type of Equipment	Maximum Level (dBA) at 50 Feet
Scrapers	89
Bulldozers	85
Heavy Trucks	88
Backhoe	80
Pneumatic Tools	85
Concrete Pump	82
Source: Federal Highway Administration 1995.	

During daylight working hours, equipment involved in construction is expected to generate noise levels up to 90 dB at a distance of 50 feet. Noise produced by construction equipment would be reduced over distance at a rate of about 6 dB per doubling of distance.

With the phase 1 configuration of turbines, the closest residence would be at location 2, about 2,600 feet from the nearest turbine. Based on the above reduction rate, a construction noise source producing 90 dBA at a distance of 50 feet would decrease to about 56 dBA at 2,600 feet, which is slightly above the Oregon noise standards. There would therefore be some potential for construction activities during phase 1 to result in moderate to high noise impacts.

With the combined 83-turbine configuration of phases 1 and 2, the closest residence to a turbine would be at location 2, about 2,000 feet from the nearest turbine. A construction noise source producing 90 dBA at a distance of 50 feet would decrease to about 58 dBA at 2,000 feet, which is above the Oregon noise standards. There would, therefore, also be some potential for construction activities during phase 2 to result in moderate to high noise impacts.

3.13.4.3 Impacts during Operation and Maintenance

Operation of the proposed turbine configurations associated with phase 1 and phases 1 and 2 combined is predicted to result in low noise impacts overall, with a moderate impact possible at measurement location 2. Projected noise levels from wind turbine operations were evaluated using a point-source propagation model. The effects of shielding from barriers in the project vicinity were not considered in the analysis. This resulted in a conservative analysis because there are likely instances in the project vicinity where the line of sight between the turbines and a receiver is blocked by vegetation or topography, and some noise reduction would occur.

The 12 sound measurement locations in the study area were evaluated for operational impacts associated with the phase 1 and phase 2 turbine configurations being proposed (Figure 3.13-1). Table 3.13-5 summarizes the predicted A-weighted noise level at each measurement location from the 41-turbine phase 1 configuration, and the 83-turbine phase 1 and phase 2 combined configuration.

Table 3.13-5. Summary of Background Sound Levels and Predicted A-Weighted Sound Levels during Project Operation (dBA)

Measurement Location	Phase 1 (41 Turbines)	Combined Phases 1 and 2 (83 Turbines)[1]	Background Sound Level [2]
1	32	40	52
2	41	49	44
3	<20	36	52
4	32	37	39
5	33	38	39
6	22	34	42
7	24	43	41
8	<20	37	49
9	<20	30	49
10	34	35	38
11	24	29	38
12	<20	<20	38
Closest residence to a turbine	Measurement location 2 @ approx. 2,600 feet	Measurement location 2 @ approx. 2,000 feet	

Because noise from the turbines would be relatively steady, the predicted Leq values shown in Table 3.13-5 can be compared to the Oregon L50 nighttime criterion of 50 dBA (Cowan 1994). With the exception of measurement locations 2 and 7, anticipated sound levels from project turbine operations are predicted to be at or below the Oregon L50 criterion of 50 dBA, and below the measured background sound level.

- At measurement location 2, the predicted noise level is below the 50 dB standard but 5 dB greater than the measured background sound level. The noise impact at this location is therefore considered to be moderate.
- At measurement location 7, the predicted noise level is below the 50 dB standard but 2 dB greater than the measured background sound level. Low noise impacts are therefore predicted to occur at this and all other measurement locations evaluated (excluding measurement location 2).

Mitigation for turbine noise is therefore not considered warranted.

3.13.4.4 Impacts during Decommissioning

Decommissioning of the facility would involve dismantling project facilities, grading, and disposal of materials. Impacts would be similar to those identified for construction activities. There would therefore be potential for decommissioning activities to result in moderate to high noise impacts with mitigation.

3.13.4.5 Mitigation

The following measures would be incorporated into contract specifications for all construction and demolition work to reduce the impact of equipment noise.

- All equipment will have sound-control devices no less effective than those provided on the original equipment. No equipment will have an unmuffled exhaust.
- No noise-generating construction activity will be conducted within 1,000 feet of a residential structure between the hours of 10 p.m. and 7 a.m.
- In the event of adjacent landowner complaints, and as directed by the county, the contractor will implement appropriate additional noise-reducing measures including, but not limited to, changing the location of stationary construction equipment, shutting off idling equipment, rescheduling construction activity, and notifying adjacent residents in advance of construction work.

3.13.4.6 Unavoidable Impacts Remaining after Mitigation

Potential unavoidable noise impacts include increased sound levels experienced by area residents during construction and decommissioning of the project.

3.13.5 Environmental Consequences—No Action Alternative

Under the No Action Alternative, existing background noise levels in the project site, study area, and project vicinity would continue without influence of the proposed project.

3.14 Public Health and Safety

3.14.1 Regulatory Framework

A variety of federal and state safety regulations and guidelines apply to project design and construction. Federal safety regulations are issued under the authority of the Occupational Safety and Health Act; state safety regulations are issued under the Oregon Industrial Safety and Health Act. In addition, the National Electrical Manufacturers Association and the Institute of Electrical and Electronics Engineers issue standards for the design of electrical equipment and controls. The Gilliam County Building Code (which is based on the Uniform Building Code) sets standards for fire, life, and structural safety aspects of buildings and related structures.

Several portions of the Code of Federal Regulations (CFR) governing the handling of hazardous materials would potentially apply to the proposed project, including:

- 40 CFR 112 (Spill Prevention Control and Countermeasures);
- 40 CFR 370 and 372 (Title III of the Superfund Amendments and Reauthorization Act); and
- 40 CFR 262-266 (Resource Conservation and Recovery Program).

Whether these regulations apply to the project would depend on the exact quantities and types of hazardous materials stored onsite. Regulations would be enforced by the ODEQ and Oregon Department of Health. In addition, development of a Hazardous Materials Management Plan in accordance with the Uniform Fire Code may be required by the local fire district.

The Federal Aviation Administration (FAA) establishes requirements for towers and other tall structures that could potentially interfere with aircraft safety. The FAA generally studies structures 200 feet or taller and may require that they be lighted for aircraft safety.

3.14.2 Study Methodology

The primary sources of information for this section were the Code of Federal Regulations, Gilliam County Building Code, and other published documents and internet resources listed in Chapter 6.

3.14.3 Affected Environment

The affected environment relevant to health and safety includes the study area and roads in the surrounding area that would be used for access during construction and operation of the project (Figure 2.1-1). The affected environment is a sparsely populated rural area of agricultural land, grassy canyons and ridgetops. Potential hazards in the area include the fire hazard presented by dry crops and grasses, especially in the summer months, and utility crossings. The BPA 69-kV Condon-DeMoss transmission line parallels and crosses the study area, and an underground PGT/PG&E gas pipeline crosses the project site in a southwest-northeast direction. The Condon airport is located approximately 4 miles east of the project site.

3.14.4 Environmental Consequences—Proposed Action

Potential health and safety risks include those that could be experienced by the general public as well as construction, operation, and maintenance personnel at the facility and crop dusters that may enter the study area. These are discussed below.

3.14.4.1 Definition of Impact Levels

- Impacts on health and safety from the proposed project would be considered **high** if exposure to a project-related hazard resulted in a substantial increased risk to human health and safety for project personnel or the general public.
- Health and safety impacts would be considered **moderate** if exposure to a project-related hazard resulted in some risk to human health and safety for project personnel or the general public.
- Health and safety impacts would be considered **low** if exposure to a project-related hazard resulted in minor risk to human health and safety for project personnel or the general public.

3.14.4.2 Impacts during Construction

Public health and safety risks for construction workers and the general public associated with phases 1 and 2 of the proposed project would be low if appropriate health and safety procedures are employed. Even with appropriate safety procedures during construction, minor health and safety risks exist for workers and visitors. Each contractor and subcontractor will maintain a safety plan in compliance with State of Oregon requirements. In addition, the applicant will maintain an overall site safety plan and will conduct weekly site safety meetings with contractors and subcontractors.

Highway-authorized vehicles and construction equipment would be fueled, serviced, and cleaned offsite. Construction equipment that is transported to the project site on flatbed trucks (because such equipment is not authorized for operation on the highway) would be fueled and serviced onsite during the construction phases. All fueling and servicing of such equipment would be in accordance with typical construction practices and in compliance with applicable laws and regulations.

It is anticipated that unauthorized visitors would be discouraged from entering the project site during construction hours by the presence of construction workers and warning signs, placards, and gates. Such access could be considered trespassing on private property.

3.14.4.3 Impacts during Operation and Maintenance

Health and safety risks for project personnel and the general public during operation and maintenance would be low, if appropriate prevention and response procedures are used. Nevertheless, potential health and safety risks during operation and maintenance of the project would exist.

Potential health and safety risks to those who farm or own property where the turbines would be located would be minimized by coordinating project activities with the schedule and access needs of farmers/owners, and through the use of warning signs and locked access gates. Entrance to the project site would be discouraged for unauthorized personnel. To prevent access to the turbines, turbine tower doors would be locked and there would be no ladders on the outside of the facility. The electric substation would be fenced.

Small amounts of fuels (diesel and/or gasoline), lubricating or other oils, and solvents would be stored in the O&M building in approved containers above ground. No extremely hazardous materials (as defined by 40 CFR 335) are anticipated to be produced, used, stored, transported, or disposed of as a result of this project. Potential risks associated with storage and use of these materials would be minimized through compliance with applicable local, state, and federal environmental laws and regulations.

An Operations Health and Safety Plan and Emergency Response Plan that inform employees and others how to prevent emergencies and lower risks, as well as how to respond to emergencies, would be kept onsite. Specific job-related training of employees, including cardiopulmonary resuscitation, first aid, tower climbing, rescue techniques, and safety equipment inspection, would also be employed.

The Condon airport may have to take into account the presence of the wind turbines in its takeoff and landing patterns. As part of project design, the proponent would comply with Federal Aviation Administration (FAA) procedures. Crop dusters planning to enter the project site area would take suitable precautions to minimize potential for collision with the project turbines and meteorological towers.

Because the project turbines and meteorological towers would not exceed 200 feet in height, it is unlikely that a Notice of Proposed Construction or Alteration (Form 7460-1) would need to be filed with the FAA. Final locations of structures, structure types, and structure heights would be submitted to FAA for review. FAA may then conduct its own study of the project and make recommendations to BPA and the proponent regarding possible airway marking, lighting, and other safety requirements.

Electric and Magnetic Fields

Electric and magnetic fields (EMF) are associated with electric transmission and distribution lines. The strength of EMF diminishes rapidly as the distance from the source increases. During project operation, the overhead power lines and substation would produce EMF in the immediate vicinity of these facilities. No residences are located in the vicinity of the proposed substation. The nearest residence to the proposed overhead transmission line is about 2,000 feet away. Any fields generated by the transmission line would diminish to background levels within a few hundred feet. Thus, the nearest residence is located beyond the reach of EMF effects. The power generated by the proposed project would not raise background EMF to levels that would be substantially different from existing levels. As a result, there would be no EMF exposure to residences and no significant increase in background levels of exposure to the general public caused by the proposed project.

3.14.4.4 Impacts of Decommissioning

If the project were decommissioned, potential health and safety risks would be similar to those described for project construction and would be low.

3.14.4.5 Mitigation

No mitigation measures are required for public health and safety.

3.14.4.6 Unavoidable Impacts Remaining after Mitigation

Potential unavoidable public health and safety risks include accidental fire that may occur during construction or operation and maintenance, accidental release of hazardous materials, or accidental injury. These constitute normal risks associated with this type of project.

3.14.5 Environmental Consequences—No Action Alternative

Under the No Action Alternative, existing health and safety risks associated with ongoing agricultural activities and with existing power lines on the project site would continue without influence of the proposed project.

3.15 Relationship Between Short-Term Uses of Man's Environment vs. the Maintenance and Enhancement of Long-Term Productivity

The proposed action under consideration does not pose short-term impacts that would significantly alter the long-term productivity of the affected environment. The turbines and associated facilities would take less than 1 percent of the arable land in the 4,200-acre study area out of production, and the remainder of the land could still be used for crops. After decommissioning of the project, all of the land could revert to previous uses. Little change in the long-term environmental productivity of the land would have been caused.

3.16 Irreversible or Irretrievable Commitments of Resources

The proposed action would include the use of steel, gravel, wood, and other non-renewable material to construct the wind turbines, access roads, electrical power line, O&M building, and substation. Materials would come from outside sources or from local borrow pits. Petroleum-based fuels for vehicles and equipment would also be required. Development of the proposed action would result in the irretrievable commitment of a small amount of cropland. These commitments are irretrievable rather than irreversible because the project could be decommissioned in the future and previous land uses restored. In addition, many materials used to construct and operate the project could be recycled upon decommissioning.

3.17 Unavoidable Adverse Impacts

Unavoidable adverse impacts are the environmental consequences of the proposed project that would occur after mitigation measures have been implemented. For the proposed wind project, the unavoidable adverse impacts include:

Land Use: Approximately 38 acres would be permanently converted to wind project facilities, including approximately 25 acres of cropland and 5 acres of CRP land. This constitutes a very small portion of the available agricultural land and CRP land in the study area and Gilliam County.

Vegetation: The project facilities would permanently occupy a small amount (less than an acre) of non-high-quality shrub-steppe vegetation, constituting less than 1 percent of the shrub-steppe in the study area. Approximately 5 acres of CRP land would also be occupied by permanent project facilities.

Wildlife: Birds and bats may collide with wind turbines or guy wires. Annual bird mortality is estimated at between 50 and 100 (mostly passerines with a few raptors). Annual bat mortality is estimated at between 60 and 160 (most likely hoary, silver-haired, and myotis).

Visual Resources: The wind turbines would be readily visible to residents, agricultural workers, recreationists, and highway travelers in the project vicinity. This could be considered an adverse impact by some viewers.

Transportation: Minor delays and interruptions in local traffic could occur during construction and decommissioning. Average daily trips would increase 1 to 3 percent on ORE19 and ORE206.

Air Quality: Low levels of combustion pollutants and dust could occur during construction, operation or decommissioning of the project.

Noise: Increased noise levels would be experienced by some area residents during construction, operation, and decommissioning.

Public Health and Safety: Accidental fire, release of hazardous materials, or injury could occur during construction, operation, or decommissioning of the project.

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